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# Railway Age

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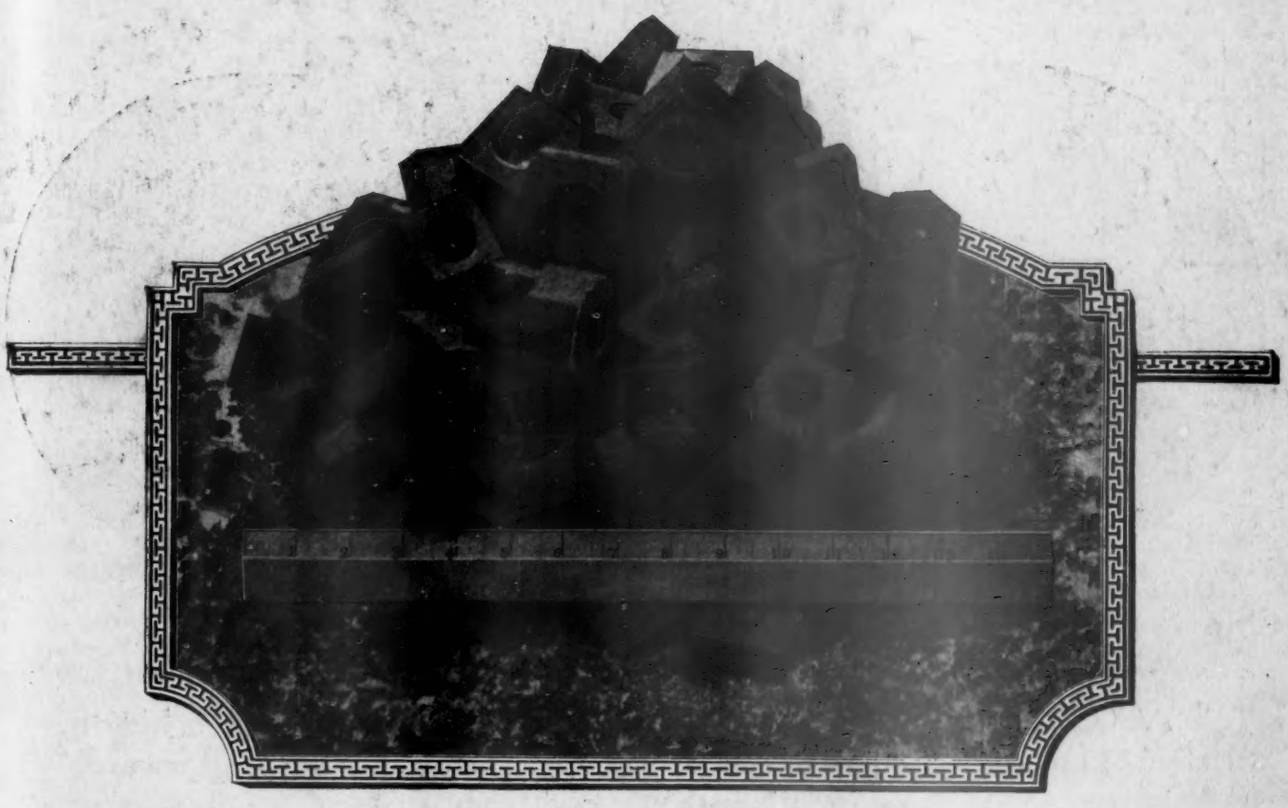

## On a Thousand Feet of Your Track—
## *Could you find this many Nuts?*

THESE nuts were picked up on less than a one-quarter mile stretch of single track.

Every nut here was put on to hold.

It failed in its job.

Its cost and the labor cost of applying it were wasted.

Furthermore, every failure necessitated a re-application.

Every failure constituted a menace to the safety of operation.

This condition can be eliminated by standardizing on Grip Nuts, the self-locking nuts that will never loosen or drop off a standard bolt.

We would like to tell you why and how Grip Nuts hold. Write.

**GRIP NUT COMPANY**

*Chicago, Illinois*

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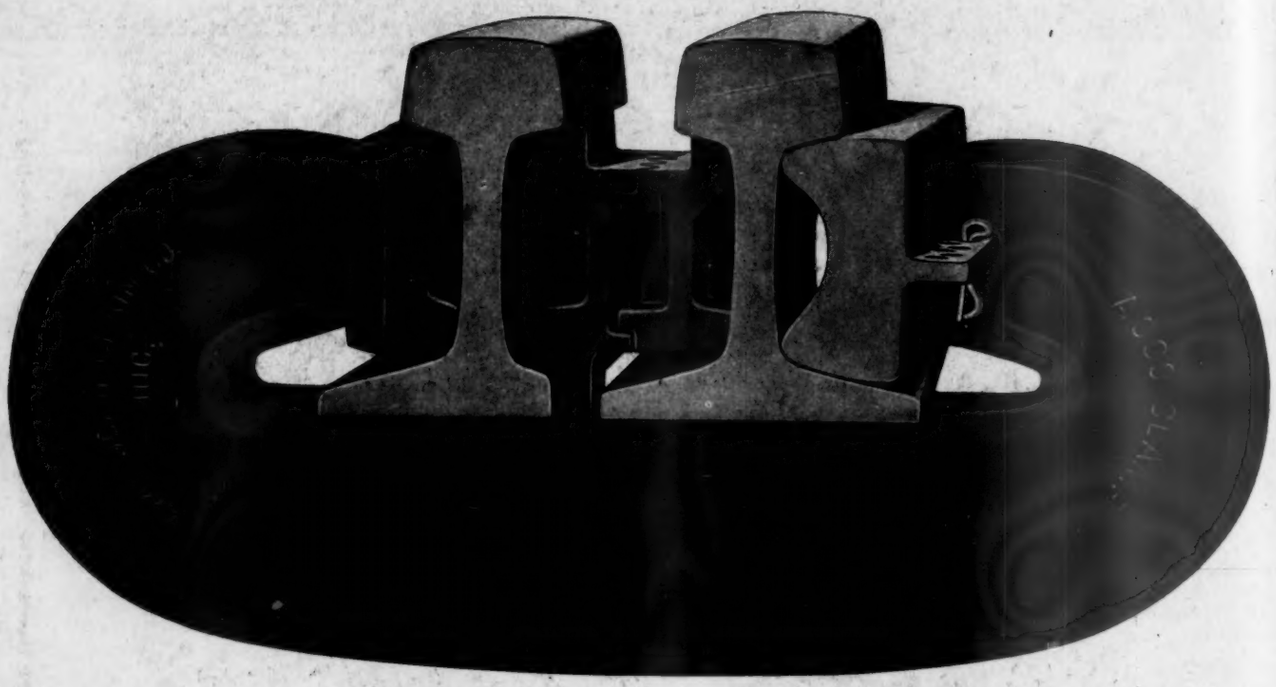
# "Acco" Drop Forged GUARD RAIL CLAMP




ACCO GUARD RAIL CLAMPS are drop forged from open hearth steel of an analysis equal to that of your rail specifications and afterwards heat treated to the required physical properties.

The design provides for an increased metal section at points under greatest tension. Filler blocks, end blocks and wedge are made of cast steel and heat treated.

Yokes are interchangeable and can be used on various rail sections by simply using suitable blocks.

## American Chain Company

INCORPORATED

Reading Specialties Division

BRIDGEPORT, CONNECTICUT

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# EDITORIAL

Railway Age

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**A Picture of Life on Freight Trains**

The government's last quarterly report of train-accident investigations contains a great variety of useful information about train operation aside from the specific question of what person or persons, practices or things, may have been to blame in any given case. The real picture of life among trainmen, so far as concerns safety, cannot be completed without the kind of information here given. One of the important reasons for introducing the block system to safeguard trains is the increasing interference from lights outside the right-of-way, as for example, on automobiles; but, except in accident investigations, information concerning lights seldom gets published. How the manual block system is operated on American railroads is a subject on which little is known except as these investigations tell us. Two cases are included here. Another item on lights in the present report concerns a road, operating two night passenger trains in each direction, which gets along without the block system and without switch lights. A third item tells of the use of three red lights on a tall mast (not interlocked), a style of signal which was in vogue 50 years ago. Another deals with a collision where trains with electric headlights met, on a straight line, about 5 a. m., killing two persons and injuring 16. The collision at Plains, Kansas, last year gave a startling lesson on this point, but, evidently, that lesson has not been learned everywhere. The safe management of work trains is an important problem with every trainmaster, whether his line is or is not block-signaled; three work-train collisions appear in the current report. Finally, this quarter's report, which will be published in an early issue, is rare, if not unique, in containing two cases where important trains were manned by crews glaringly deficient in experience.

**A New Type of Locomotive**

The four-wheel trailing truck, which has been used to considerable extent abroad, has never been favorably received on American railroads. It is interesting, therefore, to see a new design of 2-8-4 type locomotive proposed in Mr. Basford's paper before the Pacific Railway Club. In recent designs the load on the trailing wheels has become very high and in some cases is as great as the weight on the individual drivers. The tests of the Committee on Stresses in Track of the American Railway Engineering Association show that because of the distance between adjacent loads, the stresses in the rail under the trailing wheel are 20 per cent greater for a given weight than under any of the driving wheels. In recent investigations a four-wheel trailing truck under a Santa Fe type locomotive reduced the stresses in the rail from 16,900 lb. to 9,000 lb. per sq. in. The four-wheel trailing truck, of course, transfers some of the load from the drivers to the trailers. Ordinarily this would be objectionable because it would reduce the adhesive weight and, therefore, the maximum tractive force, but this difficulty can be overcome by equipping such a truck with a booster. The riding qualities of locomotives with four-wheel trucks are entirely satisfactory, if properly designed. Experiments carried out on the London, Brighton & South Coast with five different locomotives, including the 4-6-4, 4-6-2, 4-4-2 and 4-4-0 wheel arrangements showed that the 4-6-4 type produced less lateral oscillation than any of the others. The articulated frame construction proposed by Mr. Basford has been used only in Mallet locomotives and would be an innovation in a type with only two cylinders. On the whole, the design offers a highly original method for overcoming the limitations of present wheel arrangements which may be found especially useful on roads which, because of physical conditions, must adhere to limited weights on individual axles.

**New Equipment Not Everything**

Orders for new locomotives and cars have been placed in large volume for a number of months. The buying has been quite general and by this time has amounted to a total which makes it impossible now to secure deliveries for many months in advance. Some roads evidently have recognized the fact that every new locomotive and car adds to the demand for attention at shops and terminals and have made appropriations for betterments at such points. New and improved tools are being ordered and some shops or roundhouses which have been under consideration for a long time will be built this year. Other roads apparently are proceeding on the idea that new rolling stock will replace old worn-out equipment and because it is new will demand but little attention by shop forces for a long time. Many of the new locomotives are considerably heavier than older power and for this reason alone may render existing terminal and shop facilities inadequate. In order that satisfactory returns may be earned from the investment in new locomotives, it is essential that they be properly loaded and that they make the maximum daily mileage. Undue delays at terminals for cleaning, coaling, turning or in making running repairs, or too long a time spent in the back shop undergoing overhauling, are expensive and make it necessary to employ a larger number of locomotives than would be the case if sufficient improved facilities were provided more promptly to turn the locomotives back to the operating department. In some places shops and terminals are so inadequate that practically only new buildings and tools will give relief. In many a place, however, relatively small investments in tools or in alterations will give marked and immediate relief, provided good judgment is used in the utilization of the facilities available. New rolling stock is greatly needed, but there is also just as pressing a demand for facilities which will make it possible to obtain greater service from both new and old locomotives and cars.

**Popularizing the Accident Reports**

The accident reports issued by the Bureau of Safety of the Interstate Commerce Commission make valuable reading for train dispatchers, operators, train and enginemen—in fact all employees who have to do with train movement. The difficulty has been to place these reports in the hands of those who need such wholesome reading in such a form that they will be read. One road has adopted a plan of selecting and abstracting the reports of such accidents as are likely to occur on its own line. These abstracts are printed in attractive form and are mailed to enginemen, conductors and dispatchers *at their homes*. The plan has been quite successful. A few days

after one of the reports is mailed a lively discussion begins among employees up and down the line as to the points involved in the case. Intelligent discussion of such matters is a most healthful influence among employees. It tends to revive their interest in the book of rules and to make them more alert in the performance of their duties. Any road should be able to profit by awakening the interest of its employees along similar lines.

**A Little Gold Stripe**

A certain small, albeit favorably known, railroad had great pride in its locomotives. These it kept not only in excellent physical condition, but well-wiped and freshly painted as well. Pursuing this laudable policy still further it caused its passenger locomotives to be decorated conservatively with a narrow gold stripe on the tender and the side of the cab. This little gold stripe was more costly than might be supposed. Not only did it take paint and a painter to put it there, but its presence made necessary even greater attention to cleanliness; for an untidy locomotive with such ornamentation is considerably less attractive than an untidy locomotive with no decoration whatsoever. Moreover, few railroads in the territory paid any attention whatever to decorating their locomotives and many of them seemed to have scant regard even for the neatness of their power. It was small wonder then that the management of this railroad began to wonder whether its efforts to make its locomotives pleasing to the eye were worth while. Consequently it was decreed that the small stripe must go. As soon as this decision was made known, however, there was a great deal of complaint from the passenger enginemen. They were proud of their road's locomotives. They were proud of their neatness. Moreover, they were proud of the little gold stripe which gave their locomotives a certain distinction apart from the colorless locomotives of other roads in the territory. One veteran passenger engineman, soon to be pensioned, was particularly energetic in expressing his disapproval of the change. The result was that the management restored the stripe, feeling that it was but a small concession to the enginemen for the interest they had so clearly shown. Are enginemen of other roads entirely different from these? Would not most of them feel greater pride in their company and in their work if a little more attention were paid to appearances? Would not the public as well appreciate greater neatness and greater distinctiveness in equipment?

## An Ill-Considered Letter

IT IS DIFFICULT to find a reasonable explanation for the letter which President Harding wrote to the secretary of the Federated Shop Crafts on the Central Railroad of New Jersey just before he left for Florida. If the President intended to bring about a settlement of the strike, it was poorly timed. Both parties to the controversy have taken a definite stand from which this single communication cannot move them and there is no hint of further steps to bring them together. The most important effect of the letter will be the influence which it will have on public opinion. Coming from the President the statements will be accepted by many people without question. Will the impressions which the public receives in this way be correct? President Harding states that he is not able "to discern any adequate question of principle which could justify a minority of the interests involved in this distressing situation in refusing to make settlements similar to those which have been made by the majority." The principle involved is plain enough. Such settlements as the President mentions would make it impossible for many of the railroads to keep the promises which they made to the new employees.

The second important statement in the letter deserves to be quoted in full. "The information which reaches me brings the conviction that continued failure to make settlements is largely responsible for unfortunate conditions as to railroad movements in some areas and for interrupted deliveries of coal during the winter with the resultant suffering to many communities and much demoralization to industry." Apparently President Harding has not been informed that since the middle of October the railroads have moved more freight than ever before in the same period. On the Central of New Jersey the total freight moved in November, the last month for which statistics are available, was 234,119,000 ton-miles. This was 30 per cent greater than the traffic in November, 1921, and practically equal to the record business of November, 1920. The heaviest movement of coal always occurs in the fall and winter, but from September 18, 1922, to January 31, 1923, the road transported 2,904,057 tons of anthracite as compared with 2,790,075 tons in the corresponding period of 1921 and 1922, which in turn was greater than in any previous year. In laying the blame for the present coal situation on the railroads, the President overlooks the fact that the railroads cannot be expected to provide facilities to move the year's supply of coal in seven months, as many of them have been required to do this year. It is easy to understand how a man of ready sympathy could write such a letter without sufficient consideration, but logical reasoning from the plain facts of the case do not justify the statements which President Harding has seen fit to make public.

## Proposed Reductions in Transcontinental Rates

THE WESTERN transcontinental lines are adopting a policy in making rates which seems to us to be of doubtful expediency. The freight business of these roads is being affected more and more by the competition of ships operating through the Panama canal. The transcontinental lines repeatedly have asked the Interstate Commerce Commission to allow them to meet this competition by making lower rates to the Pacific Coast than they make westbound to intermediate points. The commission has constantly insisted, despite the growing competition by the Panama canal, that any rate made to Pacific Coast terminal points shall be applied as the maximum rate charged to intermediate points. This means, of course, that if, for example, a rate of $1.00 per hundred pounds is made to the Pacific Coast, and there is in effect a rate of $1.25 per hundred pounds to Salt Lake City, this rate to Salt Lake City must be reduced to $1.00, and that reductions must be made to all intermediate points which will prevent, in every case, a higher rate being charged for a shorter than for a longer haul. So long as the Interstate Commerce Commission maintains its present stand, any substantial reduction of rates to the Pacific Coast will also necessitate reductions of rates to intermediate points.

In spite of this, the western transcontinental lines have adopted a plan for making reductions from Chicago and other middle western points to the Pacific Coast in the rates on about 40 commodities. We think the adoption of this policy is of very doubtful expediency for several reasons.

First, it is very questionable whether the reductions it is proposed to make will enable the railways to capture from the water lines a substantial part of the freight now moving by ship to the Pacific Coast. Not only are the proposed railway rates not as low as those being made by the water lines, but the water lines can, and doubtless will, reduce their own rates if they find this necessary in order to hold the business. Unless the railways do get a substantially increased business as the result of the reductions to the Pacific Coast, they will gain nothing by them.

Second, so long as the Interstate Commerce Commission maintains its present stand, the reductions made to the coast will necessitate reductions to intermediate points. Most of these reductions to intermediate points will be made upon freight that is now moving by rail, and therefore, will constitute a net loss of revenue to the railways.

Third, the railways are at present before the Interstate Commerce Commission resisting reductions of rates demanded by certain interests, especially by representatives of the farmers, upon the ground that they cannot afford to make reductions of rates. If these proposed reductions to the Pacific Coast and to intermediate points are voluntarily made, the argument will at once be advanced that if the railways can "afford" to make them they can afford to make reductions in other rates—for example, in the rates on farm products. We know the logical answer to this argument. It is that the railways have got to reduce their rates to the Pacific Coast, or forfeit the business to the coast, and that they can better afford to make lower rates than entirely lose the business. Economically, this is a sound argument; but it has been made constantly for 15 years, and throughout this time the public, Congress, and even the Interstate Commerce Commission, have refused to be influenced by it. The public and Congress do not understand, or will not accept sound principles of economics in railway rate-making, and just so long as this is the case it will continue to be true that every reduction of rates voluntarily made by the railways, however justifiable as a matter of principle, will be used as an argument for other reductions which are not justifiable.

Fourth, while the transcontinental lines are suffering more and more from Panama canal competition, it is also true that in spite of this competition the net operating income of most of them recently has been showing an improvement. Most of the transcontinental lines earned more net operating income in 1922 than in 1921. Every one of the important western transcontinental lines showed an increase in net operating income in December, the last month for which complete statistics are available. It seems a questionable policy for them to begin making voluntary reductions of rates at a time when the net returns being earned by them is increasing.

Fifth, if they reduce rates to meet water competition and the reductions do not get them the increased business to the coast that they expect, they will have great difficulty, under the provisions of the interstate commerce act, in ever advancing the rates that were reduced to meet the water competition; and if they cannot restore them, they will be unable, unless the Interstate Commerce Commission gives them relief from the Fourth section, to restore the rates to intermediate points that will be pulled down by the reductions made to the coast.

The *Railway Age* has been discussing this question of transcontinental freight rates for years. As a result of the legislation that has been passed regarding the long and short haul and other developments, we have reached certain conclusions regarding the policy the railways ought to follow which it would require a good deal of evidence and some strong arguments to change. One of these conclusions is that the whole situation, with respect to the making of transcontinental freight rates, is now entirely different from what it formerly was. When the railways could make lower rates to Pacific Coast terminals to meet water competition than they were required to make to intermediate points it was sound, from a railroad and an economic point of view, to make low rates to coast terminals to meet water competition.

Before the Panama canal was opened it was much easier than it is now for the railways to make rates to the Pacific Coast that would effectively meet water competition. Under present conditions rates that are relatively very low must be made if water competition is effectively to be met. The Interstate Commerce Commission, as a matter of justice to the railroads and of sound public policy, should let the railways make rates that would meet this competition without requiring them to apply them as maximum rates to intermediate points. The rates by water to the Pacific Coast establish the true basis of rate-making to the coast, and no real harm would be done to the intermediate points by allowing the railways effectively to meet the competition to the coast without pulling down all their rates to the interior. For the present, however, with the commission refusing to allow lower rates to be made to the coast than to the interior, it is our belief that the railways should maintain rates that are reasonable and remunerative in themselves to the interior, even though this makes it necessary to maintain rates to the Pacific Coast which will prevent them from meeting water competition there.

It is quite possible that the course of developments later will make it plainly necessary for the railways to reduce their rates to the Pacific Coast, and thereby pull down their rates to intermediate territory. Statistics regarding the earnings of the transcontinental lines do not, however, in our opinion, show that that time has yet come. Viewing the railroad situation as a whole, and present conditions as well as prospective developments, it is our belief that the railways, instead of making reductions in their rates to the coast which will necessitate reductions to the interior, should propose reductions to the coast upon specific commodities, but make them conditional upon the Interstate Commerce Commission allowing them to maintain their rates to the interior.

In entering upon a policy of making reductions to the coast which will involve reductions to intermediate points, the transcontinental lines are doing something which is fraught with extremely serious possibilities not only for them, but for the railways of the country as a whole, and we have not yet heard any argument for this policy which seems sufficient to justify its adoption at present.

# The Standard Box Car

THE AMERICAN RAILWAY ASSOCIATION has recently announced that the Mechanical Division Committee on Car Construction has practically completed designs for standard box cars which will be submitted to the railroads for approval. This brings up again questions that have been before the roads in one form or another for many years. One of the chief advocates of the standard car was E. P. Ripley, former president of the Atchison, Topeka & Santa Fe. Through his efforts the American Railway Association appointed a committee to work out designs in 1914. A sub-committee, consisting of representatives of the car builders, was appointed and this was later enlarged by the addition of railroad representatives. Three designs were prepared by the sub-committees and sample cars were built in 1917. When this country went into the war, other matters engaged the attention of the railroad officers and consideration of the standard car was dropped for the time being.

In 1918 the Railroad Administration started work on its so-called standard design, practically disregarding the work that had been done by the American Railway Association committee. The work was done under great pressure and the result was a series of compromise designs which were in no sense of the word standard cars, and some of which have shown unexpected weakness in service.

Since the roads have been returned to their owners, the Committee on Car Construction has been working consistently toward the development of a standard car. The basis for the design was laid in 1920 when certain fundamental dimensions and minimum strengths of parts were adopted by letter ballot of the Mechanical Division and approved by the association. The members of the committee have now prepared a complete design and will submit it at the mechanical convention in June, so the standard car is nearer being an accomplished fact than ever before.

It is very pertinent to inquire at this time whether anyone

has ever succeeded in proving that a standard car would really be economical. To be sure, a number of plausible generalities have been advanced in favor of standard construction. The most important of these is that standard repair parts would be available throughout the country and would facilitate repairs on foreign lines. The same argument was advanced for the U. S. R. A. cars, but how many roads now have stocks of pressed steel side posts for government box cars, for instance? Is it reasonable to expect that progress in car construction will be so slow that a standard design can be maintained unchanged long enough so that the standard cars will ever form any considerable proportion of the million box cars now in service in this country? If not, it will be out of the question for railroads to carry repair parts for standard cars in stock.

Many operating and mechanical officers question whether it would be advisable to adopt as a general standard a car as heavy as a standard car would necessarily be. Some railroads do not have heavy locomotives or long trains. Their own operating conditions do not require equipment of great strength and they find it cheaper to have a few cars damaged on foreign lines than to haul a large amount of unnecessary dead weight. If the fixed charges on a ton of dead weight amount to $14 a year and the cost of hauling it $23 additional, how much would a railroad that finds light cars satisfactory lose by operating a standard design?

If the railroads of this country are to have a standard box car, they should accept it on the basis of known facts. The arguments that have been advanced in favor of this plan to date are only plausible theories.

## Short Repair Shop Schedules

JUDGING BY THE TIME REQUIRED in many railroad shops to give a locomotive general repairs, it is evident that not all mechanical department men realize the importance of shortening repair periods to the minimum consistent with good workmanship. True, the physical limitations of existing plants usually present more or less of a blank wall, but other factors than shop size and equipment enter into the problem and sometimes do not receive proper attention. The possibility, and indeed necessity, of improvement is indicated by the fact that many shops require from 12 to 15 or more days to repair a locomotive, whereas it has been demonstrated that heavy general repairs, including new flues applied, tires turned and general repairs to machinery, can be made in eight working days.

The advantages of a short repair schedule are apparent. In the first place, decreasing the time locomotives are in the backshop for repairs hastens their return to service in which they can earn revenue. In addition, fewer locomotives will be undergoing repairs at the same time, so that a given traffic can be handled with a smaller total number of locomotives. This means a smaller investment in motive power and also lower maintenance-of-equipment costs.

The length of repair periods is dependent largely on the relative proportionate size and equipment of the various shop departments, and it is to be feared that in too many cases insufficient attention was given this matter when many of the present repair shops were designed. Obviously if the machine shop is weak either through lack of space or machinery, locomotives will be delayed in the shop longer than necessary while waiting for machined parts. The machine shop is usually the limiting factor, although frequently heavy boiler jobs and new cylinder applications determine the minimum number of working days in which a locomotive can be repaired.

The space limitations in present shops are largely fixed by the original construction although in some cases additions can be made to existing plants at relatively small expenditure. By providing additional machine equipment, increasing the shop force, or working two shifts, however, the shop managements are in a position to strengthen weak departments and make sure that locomotives are being repaired in the minimum time consistent with good workmanship. The subject of proper department proportions in railroad shops is one of great importance and deserves careful study.

## Senator Brookhart as An Aid to Wall Street

SENATOR SMITH WILDMAN BROOKHART of Iowa, toward the end of the session of Congress, introduced his much heralded bill to reduce the valuation and net return of the railways. After having carefully read and reread the bill we have begun to wonder whether the Wildman from Iowa already has joined the cohorts of Wall Street. If his own theory about the relations between Wall Street and the railways is correct his bill provides for transferring from the Interstate Commerce Commission to Wall Street the power to make a valuation of the railways.

In introducing his bill Senator Brookhart said: "My bill is designed to break the hold of Wall Street on the Railroads." Wall Street could have a "hold" on the railways only through their securities. If Wall Street controls the securities of the railroads, then under Senator Brookhart's bill Wall Street could determine the valuation. The bill provides as follows regarding the valuation of the railways:

"In determining a fair value of the property of the carrier held for and used by it in the service of transportation in interstate or foreign commerce, the commission shall not fix the value in excess of the outstanding value of the stocks, bonds, and other securities issued by the carrier; and the commission shall not include any increase in the value of real estate which occurred while such real estate was held by the carrier and which was unearned by the carrier."

The bill elsewhere refers to a "fair and adequate return upon such part of the property of the carrier held for and used by it in the service of transportation in interstate or foreign commerce as *is equal to the face value* of the outstanding bonds and other securities issued by the carrier." Perhaps the Senator does not know that "face value" is the same as par value. This phraseology seems to imply that the valuation is to be made, not equal to the market value, but to the par value of the securities. However, statements made by the Senator in his speeches indicate that what he is trying to do is to get a valuation based on the market value of the securities.

Senator Brookhart has frequently asserted that the total market value of railway securities in 1920, when the original tentative valuation was made by the Interstate Commerce Commission, was only twelve billion dollars, or about seven billion dollars less than the tentative valuation. We had assumed, therefore, that when he introduced his bill it would specifically require that the valuation should be reduced by exactly seven billion dollars. Instead, it provides in effect that the valuation shall be continuously based upon the value of the securities. Any court before which a law comes for interpretation will hold that its provisions shall be applied only in future unless the provisions of the law show plainly it was meant to be retroactive. Therefore, what the Senator's bill in effect provides is that the commission shall in future base the valuation upon the market value of securities.

Now, the best available measure of the market value of railway securities is the price for which they are bought and sold on the New York Stock Exchange. On the Senator's own theory, the securities are controlled by Wall Street. Therefore, on his own theory the market prices for which they are bought and sold can be determined by Wall Street. Naturally, Wall Street wants a high valuation of the rail-

ways. Suppose, now, there was a serious prospect of the passage of the Senator's bill. Obviously, it would be to the interest of Wall Street to boost the prices of railway securities in order to establish the highest possible basis of valuation. On the Senator's own theory Wall Street could boost the prices, and obviously if it could do so it would do so. The higher the prices were advanced, the more the valuation would have to be increased. The more the valuation was increased, the larger the net earnings of the railways would become. The larger the net earnings became, the higher the prices of securities would go, and the more the valuation would have to be increased. The sky would be the only limit of the valuation which, on Senator Brookhart's own theory and under his proposed legislation, would have to be put on the railways. For a man who avows that he is attacking Wall Street the Senator is the kindest man to Wall Street that we ever heard of.

This method of evaluating the railways has the merit of simplicity. Under the law as it now stands, the Interstate Commerce Commission has been laboring for about nine years to make an inventory of all the physical properties of the railways—land, ties, rails, track bolts, ballast, yards, stations, shops, cars and locomotives—and to estimate their probable cost of reproduction, less depreciation. It has been checking over all the accounts to learn as much as it can about the original cost of the properties. Under Mr. Brookhart's bill, the commission would be relieved of all this onerous labor. First, it would have to make an estimate of the value of all the outstanding securities based upon their market prices at the time the law went into effect or soon thereafter. After having done that, all it would have to do to keep the valuation up to date would be to put a stock ticker in its office. A clerk could sit at a desk by the ticker with a lead pencil, and note every change in market price that the ticker recorded. Every time the clerk reported a change in the market quotations, a new valuation would be made.

While this method of keeping the valuation up to date would be simple, it would not be without its difficulties and embarrassments. The market prices of securities are never the same in any two consecutive minutes. To recalculate the total value of all the securities of the railways every time there was a change in market quotations would be a huge task, and would necessitate the employment of many clerks. But there are plenty of people who are willing to accept employment as clerks. Therefore, the feat would not be impossible. The situation presented would be somewhat embarrassing because the valuation would never be the same when the commission's office was closed in the evening as it was when it was opened in the morning. Nor would it be the same when the office was opened in the morning as it was when it was closed the evening before. Furthermore, it is probable that even in spite of "Wall Street control" the prices of railway securities would undergo from month to month and year to year wide fluctuations. In consequence, there would be periods when the commission would be obliged greatly to reduce the valuation and other times when it would have greatly to increase it. These large changes in the valuation would make necessary corresponding changes in railway rates. Every time there was a bull market on the stock exchange railway rates would have to be advanced, and every time there was a bear market, they would have to be reduced. But, of course, if, as Senator Brookhart proposes, the power to make a valuation of the railways is to be transferred from the Interstate Commerce Commission to Wall Street, the public will have to bear such inconveniences as will result.

We have known cases before where statesmen went down to Washington thundering mightily against Wall Street and soon fell a prey to its cunning or succumbed to its blandishments. The new Senator from Iowa is one of the loudest thunderers against Wall Street that we have heard, and it is difficult to believe that in a few weeks of service in the Senate he can have so far forgotten the declamations and promises he made in his campaign for election in Iowa that he would knowingly introduce a bill, the effect of which would be to strengthen the stranglehold that he alleges Wall Street has upon the railroads. When, however, the Senator so soon introduces a bill which would have the effect, as we have shown it would have, of transferring from the Interstate Commerce Commission to Wall Street the power to put a valuation upon the railroads, we deem it only fair to warn his constituents to keep an eye on him. He was elected for only two years and possibly this is the reason why he is making such rapid progress in doing what will enable Wall Street to bear with composure his fiery attacks upon it. Another possibility is that the Senator has devoted more time in the past to thundering regarding railway and financial matters than to studying and thinking about them. Perhaps after some who have really studied and thought about them have called his attention to the effect the adoption of his bill would have he will change it. The *Railway Age* believes he is sincerely anxious to secure the adoption of legislation which would confiscate a large part of the value of the railroads, and throw most of them into bankruptcy. These are, of course, very desirable objects, but if Mr. Brookhart is to accomplish them he must change his bill. He cannot reasonably hope to accomplish them by transferring from the Interstate Commerce Commission to Wall Street the power to make a valuation of railways.

## New Books

*Railroads: Rates—Service—Management. By Homer Bews Vanderblue, Professor of Business Economics, Harvard University, and Kenneth Farwell Burgess, General Attorney, Chicago, Burlington & Quincy. Bound in Cloth. 488 pages, 6 in. by 9 in. Published by the Macmillan Company, New York.*

The preface of this book explains its purpose to be as follows: Railroad regulation in the United States is accomplished by an elaborate system of governmental machinery. This book is designed to give information concerning that system, useful both to students and to men of affairs—to those of the general public who desire to know the present methods of regulation, to students approaching an intensive study of railroad practice, and to railroad officers whose duties have been restricted to limited fields. It is neither a law book nor a mere text on economics, but is rather a volume presenting thoughtful observations resulting from joint experience in teaching the subject matter in a university school of commerce and in active practice before the courts.

The book is a detailed, very able and interestingly written analysis of government regulation of railways. It deals primarily, although by no means entirely, with the extensive powers and varied activities of the most important regulatory body of all, the Interstate Commerce Commission. A further idea of what the book contains may be gained from the titles of the four parts into which it is divided. I—The Scope and Machinery of Regulation; II—Rates; III—Service, and IV—Management. These are supplemented with appendices: I—Development of Federal Regulation, which is a chronology, II—Suggested Readings, and III—A Table of Cases.

Government regulation of railways has so many aspects of outstanding importance that it is difficult, indeed, to select any one of them as being of superior importance as compared with the others. One of the important aspects is, of course, what may well be termed the all-inclusive character of the regulation as amplified in particular by the provisions of the Transportation Act. Another is the manner in which the jurisdiction of the regulation has been expanded and guided over a long term of years. As far as concerns the former—the all-inclusive character—the present situation is familiar

enough to the railway man, whatever position he may hold, who has to deal with it practically. The book will offer to the railway manager but little on this score. It should, however, prove most informative to others less familiar with the widespread scope of railway regulation.

A most essential feature in knowledge of government regulation of railways is information concerning what has just been referred to as the expansion and guidance of this regulation. This information is essential for the reason, in the first place, that any historical information is of value, because the history of what has taken place in the past is the best guide of what may be expected to take place in the future. In the case of commission regulation there is much more than this factor alone—as important as the latter may be—because no one can understand the purport of matters in the present status of regulation without having a clear idea of the background against which they must be pictured.

The situation in general partakes very largely and indeed very practically of somewhat the same character as the law in general. Legal decisions are largely based on precedent and the building up of the law has been a practical process in which each new decision has followed on from the related decisions which have been made before it, the entire process, meanwhile, being guided by legislation. This is a factor in commission regulation which is sometimes not given its due recognition. It is worth remembering that a large degree of the authority of the Interstate Commerce Commission—notably in the matter of rates, which has been the subject of regulation over the longest period of time—rests on the fact that the body of the decisions taken as a whole has behind it also the authority of the Supreme Court as embodied in favorable decisions.

There are many features in the Transportation Act which have still to meet the test of Supreme Court examination. Some may be found to be of less usefulness than is at present supposed; others may be found to be of greater usefulness but not of sufficient authority, in which case supplementary legislation may prove necessary. The activities of the Labor Board, in particular, have not had that intensive review that it is here held gives the Interstate Commerce Commission its present power. Until the Labor Board activities have gone through that process, the Labor Board will not have gained its full strength and most useful position, whatever the latter may prove to be. Railroad managements may have to go to the courts, as some have already done, to see just how far the Board's authority does or does not extend. Friends of the Labor Board may plead against the advisability of such action, but if the experience of the Interstate Commerce Commission is any criterion, appeal to the courts should prove one of the most necessary elements in the Board's future welfare.

All this more or less philosophical discussion does not necessarily appear in the pages of the valuable book which has been written by Professor Vanderblue and Mr. Burgess. No one can read the book, however, without being afforded a clear understanding of these several aspects of government regulation. The book covers about every angle of its subject in a manner characterized primarily by the scholarly way in which it is done.

In the first two parts of the book, dealing with the scope and machinery of regulation and with rates respectively, the authors have taken but few occasions to interpose their own opinions, for the simple reason that rates have so long been a subject of regulation that a great mass of opinion has been built up in the form of court approval or disapproval of the various commission findings. There is no mistaking the author's view, however, that regulation, both federal and state prior to the passage of the Transportation Act, was too severe for the best interests of the country's transportation efficiency.

Part III, entitled "Service," deals with such matters as the boiler inspection act, hours of service law, car distribution, transit privileges, reconsignment, abandonment of lines, etc., with a discussion generally of the scope of the commission's powers with reference to railway service.

It is in Part IV, Management, that the authors are most interesting. This is because they are discussing in the main the newer features of regulation and have essayed in instances to try to point out what may be expected to happen in the future in the working out of these features. The subjects covered include such as the obligations of the management to the stock and bond holders, the rehabilitation of railroad credit having particular reference to the transition to private control, the rule of rate-making, etc. The chapter on valuation is a particularly able one. Other subjects included are the regulation of security issues, the adjustment of labor disputes, accounting, consolidations, etc.

With reference to valuation, the authors say:

> "After all, the importance of the valuation must rest upon the future use of the figures, rather than upon their statistical adequacy, anyway. * * * The figures have not been sought as ends in themselves, but as rough measures of the amounts upon which the public is willing to pay a fair rate of return, as established by the commission. The truth of the matter is that a figure of value in the usual sense is not wanted at all; but a figure which can fairly be used to apportion earnings to railroad investors, a figure which promises to reassure investors and so to assist in the rehabilitation of railroad credit. Whatever may have been the original purpose of the valuation act, the rule of rate-making established the valuation on this basis. * * * The value figures as reported may be accepted in default of better figures, but should be accepted upon no other ground. They bear no necessary relationship to investment." * * *

The Supreme Court's decision with reference to the Railroad Labor Board's difficulties with the Pennsylvania is of recent date. The following comment on the case written several months before the decision seems, therefore, particularly timely:

> "As a practical matter, so far as this one dispute is concerned, the lower court's ruling in favor of the Pennsylvania may be considered as final and the overruling of the lower court by the court of appeals is unimportant, since the appeal to the Supreme Court has delayed determination of the question of authority until after time has very largely removed the occasion for the dispute. Indeed, the Pennsylvania in its appeal to the Labor Board included what the Board called 'a somewhat vague statement' to the effect that the employees' representatives had signified their approval of the agreements negotiated by the representatives chosen under the company plan of election. And during the shop strike the Pennsylvania claimed to have kept its shop forces substantially intact. Practical good sense will work out of the particular difficulty. But a decision of the Supreme Court upholding the carrier contention is more likely to result in amendment of the law than in anything else. That often has been the result of the successful resistance to attempted exercise of power by the Interstate Commerce Commission."

Some of the thoughts on consolidations are rather apt at this time also:

> "Until the weak roads adjust their finances, or their security holders evidence a willingness to do so, few strong roads will feel inclined to assume a responsibility akin to blood transfusion. * * * The sole compensation for consolidation might prove to be possible economies in administration and operation. These are at best uncertain. The duties most susceptible of consolidation are those of general supervision, the cost of which is but a relatively small part of the total. * * * Any scheme of consolidation built up by comparing figures and looking at maps is very apt to overlook these human elements so essential in a business dominated by attention to routine details. The obstacles are not unsurmountable, but they are very real, and it would be absurd to ignore them. * * * The great task is to get leaders."

# On Educating Farmers About Railroad Matters

## Farmer Is Fair-Minded and Accepts One-Sided View Because He Has Heard Only One Side

By Clarke A. Richards

[The author of this article is a graduate of the Wisconsin Agricultural College. He has managed a fruit farm and served for five years as a county agricultural agent in Indiana. He has been a potato raiser in Minnesota, and a fruit broker in Fargo, N. D., where he now lives, and is an expert in agricultural research. Therefore, his views on the relations between the farmers and the railroads—a matter now of vital importance—should be of great interest to railway officers. —EDITOR.]

IT WAS a community meeting of farmers. The night was hot—the sultry air made the wearied farmers sleepy; they had worked hard in the fields all day.

But a spirit of loyalty had brought them out at the call of their local farm bureau secretary. For they were promised the treat of hearing one of their state officers speak on the need of organization—of sticking together.

But he was not getting his message over. The combination of heat, humidity and weariness was making the handicap altogether too great. In desperation, he turned to the old chestnut, the old reliable, the never failing, the *one* subject that always got 100 per cent interest of any group of farmers —namely, the condemnation of the *railroad octopus*.

Immediately at the mention of the magic word "railroad" the lethargy was broken; an electric effect took hold of his audience—they were tense, eager, expectant. He had their undivided attention.

None questioned his statements. He got his message over. His enthusiastic audience agreed with him in his plea, "We must stick together to fight our common enemy—the railroads."

This is a scene that is being enacted every day of the year in hundreds of instances. Take one state, for example—Indiana. There are about 1,000 townships, most of which are organized as units of the farm bureau. Each of these will average at least two or three meetings per month at which the farmers' ever increasing problems are frankly discussed. Multiply this number of meetings by the 48 states, with the addition of numerous gatherings of community clubs, livestock clubs, promotional clubs, radical political clubs—and one will realize how often the farmers are receiving their impressions regarding the modern American railroad from statements proved time and time again to be without basis and unsupported by facts.

Why are there dozens of cases where farmers will listen to and believe the wildest tirade delivered by some imported speaker—giving him their undivided attention, never questioning his data, his statements, his statistics—never asking him his authority—never requiring proof?

The American farmer is fair-minded. The reason he accepts one side of the question is because he thinks it the only side. It is presented to him time and again, always with the same condemnation of the acts and motives of the railroads and everyone connected with them.

When the farmer does finally receive a word regarding the other side, it is in some legal, forbidding, uninteresting looking document—usually the day or week after some fiery orator has warned him that the railroads are using some underhanded methods for spreading their obnoxious propaganda through booklets—after he has been warned, exhorted and begged not to read their untrue tracts.

But the new farm community leader is a man of the highest intelligence, an open-minded citizen who will admit that there are two sides to every argument. When he accepts the responsibilities of his office in his community organization, he assumes the obligation to co-operate with manufacturers, business men, and all others with whom the farmer comes in contact and with whom problems affecting both may be worked out.

The job of the American railroads at the present time is to get in touch with these broad-minded men, to let them get some insight into the other side of the problem, and to then seek a common ground on which to work it out.

First, who are these men?

Second, how best to get in touch with them?

### With Whom to Get in Contact

Of course the county agricultural agent is the acknowledged leader of farmer activities in his county. He is placed there and maintained through the co-operation of the local county farm bureau, the county, state, and federal governments, with local organizations of business men and boards of education frequently co-operating in the good work.

These men are chosen for their work because of special qualifications which include good, sound judgment under trying conditions and the ability to use tact.

Many railroads have recognized that these young men can give this problem unbiased consideration. Accordingly, the railroads are frequently sending them letters and literature regarding the latest developments. This is good practice, but it is just scratching the surface.

Because these young men are paid co-operatively by funds from federal, state, county, farm bureau, and frequently other sources, it is patent that they cannot actively take part in this controversy. But they are good men with whom to keep in touch and to keep informed.

But the local community farm bureau chairman, his unit secretary, and one or two of the most progressive members should by all means receive enlightenment regarding the present day railroad difficulties.

Such is equally true of the leaders in the local livestock associations, the fruit growers' clubs, the shipping organizations, the community clubs, the farmer sections of the chambers of commerce, and the many other non-religious and non-political farmer organizations. Political farmer organizations are hopeless and their organizers have been threatened a ride out of the county on a rail by representatives of at least one farm bureau in Indiana. They are so biased in their views that they are best let alone. It is a waste of endeavor to try to reason with their leaders. They are government ownership advocates. The other farm organizations should not be confused with these political organizations; they are more sane, less radical, and very little is heard in their meetings in favor of government ownership or other fantastic socialistic ideas. Their motives are far less selfish than those of the political organizations and they believe in "live and let live."

In other words, even though a vast majority of the farmers in a community might be so biased and bitter on the subject that their convictions cannot be readily changed, yet one or two of the key men—the open-minded—those open to con-

viction, are of more influence and value than all of the others combined. They are the safety valves.

These are the men to look to for fair treatment. Until the present time, but one side of the problem and proposition has been put up to them, and they are whole-heartedly pushing it. They are condemning the railroads for selfish, grasping, and unfair tactics. They are in earnest. They are demanding more and even more government regulation of railroads. They are men whose support carries weight.

In one case at least, literature which has just been sent to a farm bureau office by one of the largest eastern railroads entitled, "Facts—Brookhart and Shipstead Answered with Facts," caught the attention of one of the most loyal of farm bureau boosters. He liked the open way in which the railroad executives made their frank avowal that they were to challenge every misrepresentation in the future. He, like every farmer, admired a fighter. He even began to question the advisability of further government restrictions.

When he started discussing the situation, he was given an opportunity to read excerpts from two editorials which had appeared in a railroad trade journal some months ago. This man also talked the matter over with one or two of the local business men. He left for home with a grave question in his mind. He was not entirely sure that the local unit of the farm bureau had exactly the fair attitude on the railroad question.

At last, the railroad companies had got their message to this key man—but by what a long, roundabout slow method!

Why not send it to him directly? He is not the type of a man who will destroy it without consideration. There are not enough key men in any community so that the mailing list will be so large that the expense will be prohibitive.

How get this mailing list? Ever ask the farm bureau agent? He is usually a level-headed, fair-minded young fellow who realizes that a goodly lump of his pay is coming from federal sources, no small part of which the railroads are paying in taxes, and that he can therefore give ten minutes of his time to jotting down a few names and addresses—especially as long as the railroad company is not going to mention the source from which the names were obtained.

And do your traveling railroad agricultural agents keep their eyes open for the names of real farm leaders whose good-will means more than that of dozens of their less progressive neighbors—the kind who do the thinking for the whole community club? The railroad district agricultural agents can get this information from local bankers and business men, and very frequently they can secure it from the local farm bureau officials.

The local officers of the livestock shipping association have close relations with the railroads. Ever write to them or to the heavier shippers of fruits, potatoes, local farmer fertilizer agents, limestone agents, farmer elevator managers, etc.? These are the men who more frequently pay freight bills and to whom the increased cost of freight is brought home more clearly. Your local freight office can be of material assistance in sending you a list of these key men.

An instance has been given of one case where a doubt has been engendered in the mind of one loyal farm bureau leader. Will not this clear thinker be inclined to ask the next fiery orator who is condemning the railroads in a wholesale manner—on what grounds he bases his assertions, from where he obtained his data, for proof of the accuracy of his statements and statistics? In other words, the 100 per cent attitude of agreement in the audience stands a chance of being undermined with just a little current of doubt. He is beginning to show that he feels that after all there may be two sides to the question. Multiply this case by the thousands which are possible when other key men on your new mailing lists are given the same opportunity of receiving facts—and while the present enmity of the organized farmer may not be changed to friendship, it will at least be changed to a more healthy attitude—to that of fair-mindedly wanting to know both sides of the question.

### What to Send

Twenty years ago the federal government at Washington sent out legal looking documents called Farmer's Bulletins. The state experiment stations also published rather dry, forbidding appearing circulars and reports.

Today these same bulletins are published with covers and contents illustrated so profusely that the pictures almost tell the story. The popularity of the bulletins has grown by leaps and bounds in these 20 years.

Why not profit by their example? Or why go to the government for the example? Witness the promotional literature put out by any railroad. Is it a dry looking unillustrated pamphlet, or is it crammed with the most suggestive of illustrations, such as realistic photographs of fruit that fairly stand out from the page and invite one to partake freely?

Then why publish unillustrated, dry tracts on the railroad problem for the consumption of the farmer—especially when he is being exhorted not to read any of your literature, which, he has probably been warned, has been designed to undermine the effectiveness of his organization and other such rot? Why not make the covers of these attractive—the farmer is accustomed to attractive looking farm journals? And why not profusely illustrate the interior—the farmer is used to adequately illustrated contents in his farm papers?

But on the other hand, why show that your literature is patently designed for the one and only purpose of discussing the railroad problem in relation to the farmer? Why not include this in some form of literature which the farmer will treasure and keep on hand at all times because it contains something of value to him as a reference?

Why not publish a booklet on the proper way to prepare potatoes for shipping? If you have ever had the pleasure of accompanying a state car-lot inspector of potatoes, you will see that the cars are carelessly loaded, inadequately protected against freezing at the bottom, etc. The large potato growers—invariably progressive farmers and keymen in their community—will appreciate such a booklet, make good use of it, read it through, not only the portion in regard to preparation of potatoes for shipment, but also the other good sound facts you can get home to them about your mutual interest in the railroad problem, more common sense solutions, and less half-cocked radical politician ideas.

This booklet idea will work with large poultry raisers, fruit growers, members of livestock shipping associations, farmers desiring a storage bin for agricultural limestone, members of farmer elevators—in fact every one of the most progressive farm leaders in any community.

### The Common Ground

Service is the common ground on which the farmer and the railroad men can meet. Eliminate the demagogue who is running up and down each of the states with his tirade against the railroads, and you will find that the farmer is fully as interested in talking over the proposition of how members of the local live stock shipping association can load their stock into the cars at five o'clock in the afternoon to catch the cannon ball freight, number seventy, instead of having to load in the heat of midday to catch number eighteen in order to get to market in time for their hogs to get a good fill of corn and water early in the morning to eliminate the drift. Constructive plans to increase the local service and use of the railroads are what the farmer is interested in if the outsider will give him a chance to think for himself once more.

And maybe if a few concise facts are presented to the best thinkers among the farmers, they will start thinking for themselves once more—to the benefit of us all.

# As to the Locomotive—What Next?*

## Co-ordination with Other Facilities; Harmonizing Features of Design, 2-8-4 Wheel Arrangement Proposed

By G. M. Basford
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ACCEPTANCE of the locomotive as the most promising single factor for reduction of the cost of transportation is proceeding rapidly. It has not always been looked upon as a possible cost reducer. There are reasons for this. Consider locomotive history which divides itself into three eras.

First: The beginning of steam rail transportation. We must admire those who pioneered without precedent, giving us elements, principles and even construction that endured for a half century without radical changes from an engineering standpoint.

Second: The period of increasing weight and power with practically no persisting improvements making for higher efficiency in fuel or in weight. During this time our locomotives were crude pullers of trains. Too many unmodernized locomotives are just that today. While stationary and marine engineers went rapidly forward toward higher efficiency, producing power in greater units yielding power at lower cost, locomotive people faced transportation demands that taxed capacity. Refinements were not ready. Therefore development went to bigness, brute force and weight. This brought good things, such as heavier rail, stronger bridges and capacious yards. It also brought mighty machines ready to the hand of our present engineers for application of many improvements that make for more power per pound of fuel and per pound of metal.

Third: This is our era. The era for reducing ton-mile-per-hour costs by means of improved locomotives. It is the era for co-ordination of the locomotive, into the rapidly developing scheme of efficient railway operation. Engineers inside and outside the railways and railway officers, executive and operating, are beginning to co-operate. Never before in locomotive history have six railroads simultaneously striven for better locomotives to reduce their cost of transportation as six roads are striving today.

Many operating officers do not yet realize how much the improved locomotive can help them. They do not yet realize how much help they need from the improved locomotive. Through a perfectly natural development these officers control the expenditures, the investments that mean most to their own success. They are the ones in general, who decide questions of investment in improved locomotives and investment in all facilities that render the locomotive more productive. Because of tradition the steam locomotive is handicapped today as to its productivity. Operating officers are in position to remove this handicap. We must take it upon ourselves to tell them about it.

### Locomotive Earnings

William Elmer throws light on this subject in his paper before the American Society of Mechanical Engineers, June, 1921. He shows that in 1920 the average freight engine earned $370 per day or 26 cents per minute but that it made less than 60 miles per day. On another occasion (before the Central Railway Club in January, 1923) Mr. Elmer shows that for the month of October, 1922, the average daily mileage of serviceable freight locomotives was 84 miles. Are we to be satisfied with these figures? A locomotive is too expensive a machine to be running only 7 hours out of a possible 24 hours.

For a $47,000 Mikado engine the fixed charges are $14.40 per day or one cent per minute. It would be good business policy as far as fixed charges are concerned greatly to increase the first cost of the locomotive if a small percentage of the fuel may be saved thereby. Locomotive loading is so important as to cause a loss of $100 per day or $3,000 per month with an error of 10 per cent in overloading or underloading on a single division of a road having heavy traffic. This reveals the importance of the operating side of the question we are trying to answer, as the locomotive referred to burns from $10 to $15 worth of fuel per hour and wages amount to about $4 per hour.

As to the use made of locomotives are we to be satisfied when they are approximately but half the time in the hands of the operating officers and the other half in the hands of mechanical officers? Of course, there is a lot of avoidable delay in each case. Here is an opportunity for co-ordination of loading, using and maintaining locomotives that must not be overlooked.

Co-ordination of two kinds lies before us. First, the locomotive must be harmoniously co-ordinated as a vital element into the great transportation machine. It must fit and perform in time and in tune with physical and operating improvements which are coming forward with great rapidity and promise. Second, the locomotive must be co-ordinated within itself. Every feature and factor of design must be made to harmonize with every other for the production of more ton-miles-per-dollar of total cost.

Our locomotive is a machine within a greater machine. This demands of locomotive men a thorough understanding of track, operation and signaling. It demands of operating men, track, bridge, terminal and signal men a thorough understanding of the locomotive which must be considered as a huge investment capable of producing dividends greater than it has ever produced. It demands of engineers who would improve the locomotive a careful study of all phases of this co-ordination.

### Locomotive Co-ordination—Factors Outside of Itself

Recently an Eastern road invested $14,000,000 in a new line to reduce a heavy grade. It is up to the locomotive to increase the return on this investment. In railroad operation there are few features of improvement that do not directly call for corresponding improvement in the locomotive. These items require more elaboration than space and time permit of giving here. A mere list, however, reveals the problem.

#### Cars

Through the Canadian Railway Club E. R. Viberg shows that since the year 1876 normal freight cars have increased 285 per cent in weight and 1,080 per cent in earning capacity. Passenger equipment cars are growing heavier. Twenty years ago the heaviest passenger locomotive weighed no more than a single dining car today, 170,000 lb. Remember, this weight and the comfort it represents rests on the locomotive. Container cars are coming forward rapidly. So also is equipment for mechanical handling of bulk and package freight. Cars of very large capacity, used in increasing

*Abstract of a paper presented before the Pacific Railway Club, March 8, 1923.

numbers, as in the Eastern coal traffic help the locomotive by reducing the number of axles to carry a given load. Cars must be strong and heavy to provide safety and reduce maintenance. Cars represent large and increasing investments. They must not be kept waiting by the locomotive. The serious and destructive car shortages of the recent past were really locomotive shortages. Many thousands of cars waited for locomotives to move them.

### Yards

Yard facilities are improving the country over. Every yard extension involves increasing difficulty as to providing land. Every improvement of a switcher reduces the necessary investment in land for yards. The switching problem calls for locomotive co-ordination in order to make most intensive use of yards. Those days are gone when old road engines would do for switching. Switch engines call for most careful design, that they may make every track of an expensive yard more productive. Road engines coupling to heavy trains at yards must be equipped for rapid acceleration to clear the outgoing track quickly for following trains.

### Engine Terminals

Locomotive terminals would justify a chapter by itself. Many a locomotive terminal limits the productivity of the locomotive power of its road today. Every improvement in this field calls for a corresponding improvement in the locomotive to take full advantage of the investment. Think of ash pits, inspection pits, coaling stations, roundhouse and roundhouse shop facilities. These are coming forward rapidly. Soon every roundhouse will have cranes, traveling cranes and post cranes, drop pits, means for handling parts too heavy for archaic, man-killing methods, means for washing boilers quickly with hot water so that big boilers need not be damaged by washing and filling with cold water. It is a six to ten hour job to gradually cool a boiler down. Improvements are also ready for rapid firing up of boilers, for saving time and labor in dealing with ashes, sand and coal. Again, shop equipment is receiving more attention than has been given to it for many years. But our railroad shops are many years behind the requirements. Every order for new locomotives should be accompanied by a corresponding program for more machinery and facilities for maintenance.

### Water Stations

Formerly water stations were located conveniently to the water. Now water is piped for the benefit of the train service. Water is being purified, or at least rectified, to the great advantage of locomotive tonnage and mileage. The object of these things is to enable engines to move more cars and faster. Why should the engineering department build the water treating plant, the track department operate it, the mechanical department use it and the operating department depend upon it for net earnings? Here a bit of co-ordination is needed.

### Rails and Bridges

Rails as heavy as 130 lb. are in service and even 150-lb. rails are provided for. Track has improved. Even the obscure job of the section foreman today calls for a specially educated and very intelligent man in order to take scientific care of up to date track. Timber trestles are of the past. Every new bridge is a strong, heavy one. How seldom do we feel the train slow up for the bridge today. To make this great investment in roadway most productive is an important factor in considering new locomotive designs. When a railroad equips with any track improvement its locomotives are given a better chance to increase net earnings. Even this calls for co-ordination.

### Train Delays

Track capacity and possible increase of traffic density are being studied by means of "time-distance" charts. Dispatchers are exerting themselves to give trains a chance to run. A new term, "Main Tracker," means much today and will mean more every day. It means the making up of trains for movement, intact, through intermediate terminals to more remote destinations. Through freights are being kept out of intermediate terminals. One road is saving three-quarters of a million dollars monthly by doing this. Another road saves between 50 and 60 eight-hour shifts of switchers every day by this plan. Not every road can do as much as this but when it can be done it gives road engines a new duty. It is important for the locomotive to measure up to an improvement that meant one and a half millions of savings to one road the first year "Main Trackers" were tried.

Elimination of train delays is the subject of deep study. Dispatching and spacing of freights is prominent in the minds of those like the Illinois Central people who seek uniform movement, using to best advantage all facilities making for maximum ton miles per hour. As ton miles per hour increase, cost per ton mile decreases, the limit being when speeds become great enough to increase fuel costs above the saving in wages. But who ever reaches such speeds? Train delays appear to be more a function of the number of trains than of the loads of trains. This puts a problem up to the locomotive. Heavy tonnage, good speeds and reduction of delays are demanded. Consider what the "Peg" system means to the Buffalo, Rochester & Pittsburgh. Everybody concerned in the movement of a train is told what is expected of him as to time. Delays are recorded in terms of cost. This leads to locomotive co-ordination most practically. On that road the plan has led operating officers to help the mechanical officers secure necessary maintenance facilities and locomotive terminal facilities. There is co-ordination of the highest order.

### Train Loads

Tonnage rating to give every engine every day its proper load offers opportunities for record making savings. At least one railroad hauls all its freight in trains averaging over 2,200 gross tons each. This road hauls 5,000 ton freights at 25 mile schedules. In five years the average revenue train load of the country increased over 53 per cent. James J. Hill brought the heavy train load but even he did not think in terms of 10,000 ton trains. Trains of this weight have been put up to a single locomotive and have been hauled successfully. Car and train loading are inseparably associated with the locomotive, requiring closest co-ordination in the design of new power.

### Long Locomotive Runs

Formerly locomotives were designed and built for short railroads, then for divisions because the roads grew that way. Now they must make long continuous runs. The Southern Pacific was a leader in this change. The Santa Fe is also a leader. The Missouri, Kansas & Texas has broken all long run records. But we must build engines that will more nearly approximate the continuous service of marine engines and this can be done. One road does with 16 engines work formerly requiring 21, by increasing the run from 150 to 260 miles. Oil fuel overcomes one of the greatest obstacles to long continuous runs. The locomotive must be co-ordinated with this operating improvement and coal burners must be made to do it. Great monetary savings are being effected by longer locomotive runs. This is one of the most important operating improvements of our day. It is one that calls for co-ordination in locomotive design, construction and maintenance and adequate facilities for maintenance.

### Signals

Signaling is taking a new place in increasing the ton miles per hour delivered at the outgoing end of the road. Signals are giving the locomotive a better chance to run. Their safety function is more important than ever but their great

function today is to tell trains when and how fast to go. Locomotives must co-ordinate with signals in increasing the capacity of single and double tracks to defer the necessity of expensive additional tracks. By aid of signals certain tracks are used in either direction to help in times of congestion. Gradually the "31" train order is giving place to the "19" order. Every change from a "31" to a "19" train order saves at least ten minutes for a tonnage train. At times it saves several times ten minutes. The Southern Pacific is a leader in this. Before long signal indications will replace train orders of any kind as they do in the New York Central tunnel, the New York Subway, the Lackawanna and other congested roads. They should be made to do it for far less congested roads.

Outlying siding switches are being handled from a distance by low voltage switch machines and signals. They are controlled by the dispatcher through the nearest station or tower operator. On one road six such machines saved 17,000 stops in one year aside from the saving in break-in-twos of very heavy trains. On another road, these machines that save two stops for every tonnage train that takes a siding, show net earnings of 25 per cent on the investment. The mere saving in fuel is by no means the only expense avoided whenever a train is stopped and started. We stop trains too often and too easily. We should keep them moving and call some one to account for every unnecessary stop, as the steamship people do.

Locomotives must co-ordinate with these improvements and must also be ready for automatic stops and train control which are coming rapidly. Signal people are working on a number of roads to increase average speeds from 8 to 12 miles per hour. H. Ashton, in the *Railway Age*, December 24, 1921, presents figures showing how rapidly operating costs mount as train speeds are reduced below 10 miles per hour. Doubtless many roads will utilize signaling to develop "turn-around" plans for enabling locomotives to double divisions as is now being done with success on a well signaled road, the Western Maryland.

### Draft Gear

For draft gear the link and pin sufficed for many years. Bigger engines and the air brake put a better gear forward. Better draft gear has brought better draft attachment to the car. Heavy trains emphasized the need. Service shocks frequently exceed the capacity of the most efficient draft gear and the draft attachments must transfer the load to the car underframe. For this reason draft attachments must be stronger than the draft gear. A break-in-two of a heavy tonnage train is a very serious expense. Nothing on the railroad is called upon to stand the abuse that is imposed upon draft gear. What are you doing about this?

### Up to the Locomotive

What must the locomotive be and what must it do to earn most for these large investments? What must it do to overcome sky-high wage and fuel costs? The next new locomotives must be built, operated and maintained to perform a new part in the reduction of the cost of transportation. Placing new locomotives on our rails for say 30 years of service is a matter to be approached thoughtfully. If we are to save the race against government ownership we must regard the locomotive in a new light. All the new ones must be built and bought for efficiency, for maximum earnings on the investment, the investment in everything the railroad owns. It must have appropriate attention in maintenance.

A big problem lies before operating, engineering, signal and locomotive men. It is a common problem for all. It calls for a definite and complete understanding on the part of every department of the railroad with respect to the problems of every other department. The entire railroad must be balanced as a good orchestra is balanced, by co-ordination and co-operation. Consider what any prominent instrument in an orchestra does when out of time or tune.

### Locomotive Co-ordination—Factors Within Itself

This era began with plain engines. Modern locomotives are efficient and necessarily complex power plants. Between these two there is a vast difference. Improvements were developed independently, usually not by the builders but by independent companies, each devoting its efforts to its particular problem. This has brought very highly developed individual factors for increasing capacity or improving efficiency. In the combination of these factors with improved detail design, co-ordinating the locomotive into a truly efficient power plant, lies our present problem. Weight questions now predominate. The locomotive must be designed as a whole. It must not be condemned to run for life without certain efficiency factors because weight limits do not permit of applying them. Because of weight limits locomotives are being built today without boosters, stokers and feed water heaters. These particular engines can not even be built for later application of these efficiency factors and must run wastefully for the next 20 or 30 years. But truly co-ordinated designs will permit of obtaining the savings these factors are ready to effect.

(At this point Mr. Basford discussed in some detail the advantages of superheaters, brick arches, thermic syphons, feed-water heaters, mechanical stokers, improved valve motion, power reverse gears, water purification, steam separators, alloy steel parts, improved lubrication, fan blast and higher steam pressures.—Editor.)

### Excessive Weight on Trailers an Important Problem

Trailing wheels were added to carry heavy fireboxes. They are needed for power at speeds when high boiler horsepower is demanded. The booster puts these wheels to work at low speeds, in starting and at critical points on grades and turns this loss to advantage at times when high boiler capacity is not needed. It helps the operating officer to increase tonnage, to increase acceleration to speeds. It is the means whereby a trailing wheel locomotive is placed in the class above itself as to tractive power. It avoids the necessity for another pair of drivers, needed in starting but superfluous when the train is rolling. The booster is a necessary improvement. It increases the weight of the back end of the engine and we must provide for this weight. It most certainly can not be taken out of the firebox weight but must be taken care of in addition thereto. No locomotive with trailing wheels should be built without utilizing these wheels for traction in starting and on the critical points on grades.

### Ash Pans

Long locomotive runs reveal weakness in this neglected item. Pans must be larger. They must have greater air openings in order to reduce the vacuum below the grates. A ratio of 14 per cent of the grate area is considered satisfactory if the rate of combustion is low enough but with 14 per cent over one inch of vacuum has been measured in the ash pan. Why not make this area of opening 20 per cent of the grate area? Why not make openings as large as possible? We should supply at least 33 per cent excess air which means 16 lb. of air per pound of coal. Do you realize that at a combustion rate of 120 lb. of coal per square foot of grate per hour very nearly one ton of air must be supplied every hour for every square foot of grate area? What locomotive gets that much? Do you realize that at 10 lb. of air per pound of coal and a consumption of 10,000 lb. of coal per hour the firebox will demand 1,300,000 cubic feet of air, or 100,000 lb. per hour?

Test plant records indicate that we are forcing fires to the point of inefficiency. Fig. 1 indicates a drop of 6 per cent in boiler efficiency as the rate of combustion goes up from

110 lb. of coal per square foot grate per hour to 140 lb. Grates call for immediate intensive study. Why should the air openings through grates vary from 26 to 50 per cent in 62 cases of grate practice for soft coal engines recently studied? Differences in the character of coal do not explain this variety of figures. Who is in position to defend such chaotic practice? Who is in position to be proud of our grate practice today?

### Grates and Grate Areas

Grate area affects losses in sparks and cinders. Run of mine coal with a large proportion of slack will make more sparks and cinders than lump coal, and what about lignite? This calls for lower velocity of air through grates. Velocities

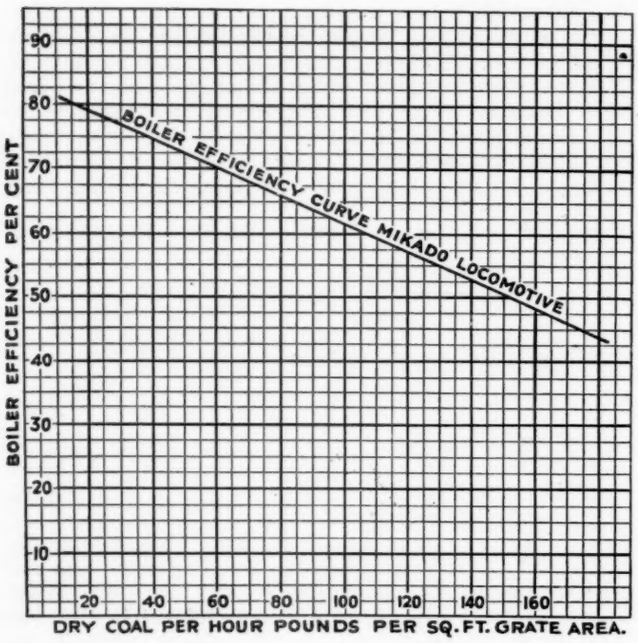



**Fig. 1—Boiler Efficiency Decreases Steadily as the Rate of Combustion Is Increased**

of gases through the firebox range from 100 to 300 ft. per second, as fast as 200 miles per hour. We cannot wonder that this lifts sparks and cinders from the fuel bed. For years we have fired much more coal than has been burned. The stoker is doing this now because of high combustion rates.

Coal does not burn on the grates. The fire itself is mainly a gas producer. At the rate of 120 lb. of coal per square foot of grate per hour and 12.25 lb. of air supplied per pound of coal and with a high volatile coal (Westmoreland with 14,430 B. t. u. heat value per pound) 2,000 cubic feet of gas is evolved every second. A firebox of 311 cubic feet capacity is filled with gas six and a half times every second. This reveals the task we are asking fireboxes and boilers to perform. We must do our best to take as much of this heat as we can while it is in our hands. This calls for firebox volume, and combustion space. These add weight. The job of the firebox is to absorb radiant heat. This discussion does not attempt to cover the absorption of the heat after it is created. It may be said, however, that any and all progress in the direction of reducing the rate of combustion by providing larger grates helps in the next step—that of absorbing the radiant firebox heat. When grates are large enough it is easier to get the volume the firebox requires, but this again brings us face to face with the problem of weight.

Firebox designers are faced with the fact that the firebox evaporates about 40 per cent of the total. Firebox heating surface is from 5 to 10 per cent of the total heating surface but it effects from 25 to 50 per cent of the total evaporation.

Why is it necessary to fight for steam in a fairly well designed and proportioned coal burning firebox when that same firebox yields steam "to burn" when oil fuel is introduced? Oil burning temperatures that range about 2,500 deg. F. as compared with about 1,800 deg. F. for coal is the answer. Coal fire temperatures may be raised by forcing but with correspondingly increased spark and cinder losses. We must get greater volume of heat from coal. Oil burning in this western country has thrown a searchlight on the locomotive furnace problem. It strongly suggests that we must secure more power from coal without wasteful forcing of the fire.

In locomotive service oil has always been burned in fireboxes designed for coal. Oil leaves no ash, discharges no sparks or cinders and, if it has air enough and room enough, it burns completely. In many oil burning engines, however, the combustion space is too small and the action resembles a blowpipe flame. This puts tube and firebox sheets to a test that they would not encounter if more combustion space was provided. Why not design a real oil burning locomotive firebox, which your speaker believes has never been done? Would it have a circular cross section and a long combustion chamber? To get the utmost out of oil, weight must be added at the back end. Therefore, the weight problem is common to oil and coal burning.

In order to burn low grade fuel the Baldwin Locomotive Works built Mikado engines with wide grates, for the Bismarck, Washburn & Great Falls in 1902. These are believed to be the first Mikados used in this country. The first of the type were built in 1897 for the Nippon Railway of Japan by the same builders and also for a very inferior quality of fuel.

High rates of combustion brought the wide firebox. The wide firebox brought the trailing wheel. The stoker eliminated the limitation of the human hand, arm and back. Locomotive improvements that make for greater capacity, for efficiency and economy have delayed the next step but increasing demand for power has again brought a limit. Again it is the firebox. Not only must we provide weight for the larger grate and the locomotive furnace but we must have the booster and the stoker—all at the back end of the engine.

### Threatening Limit to Locomotive Progress

While locomotives have been increasing very materially in size in the last few years, certain limiting features of design have not been correspondingly increased. Locomotive designers have met this limitation by the addition of front truck and driving wheels to take care of the additional tractive power.

In conventional locomotive designs the firebox has been carried by one pair of wheels located underneath the grates. The wheel load of the trailer is, of course, subject to the same limitation of weight as the drivers. In practically all modern designs trailers have been loaded up to their limit. Weights as high as 60,000 or 63,000 lb. have been used. Most roads do not like to exceed 55,000 lb. and some confine the limits below that figure. It is evident that the size of firebox which can be applied as related to the grate area and firebox heating surface is obviously limited by the allowable weight on the trailer axle.

In the search for means for increasing the power of the locomotive we have now come squarely up against this limitation of trailer weight. Greater and greater horsepower outputs are required which call for larger firebox volume and more grate area for burning the coal. With the present construction we are limited by the trailer wheel load mentioned above. The consequence of this has been that the size of grate area and fireboxes have not kept pace with the increase in cylinder horsepower output. An attempt has been made

to make up for this by adding heating surface in other parts of the boiler which are not carried directly over the trailer, but this is only a partial remedy for the difficulty. The result is that the grate being limited as indicated, there has been a constant tendency to burn more and more coal upon a given area of grate or to increase the rate of combustion. In some modern designs the rate of combustion per square foot of grate to meet the maximum horsepower demands has

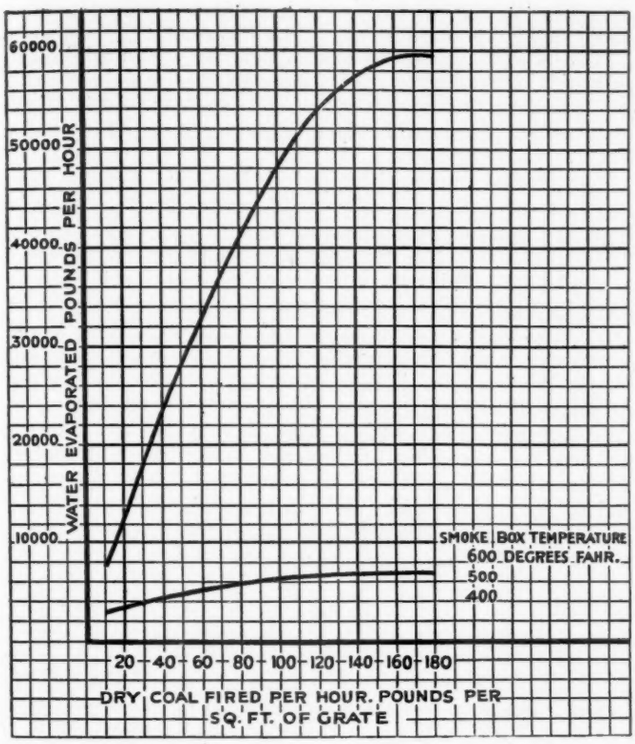



**Fig. 2—Increasing the Rate of Firing Beyond the Capacity of the Firebox Does Not Give a Corresponding Increase in the Amount of Steam Generated**

gone as high as 130 lb. based upon first-class coal. In fact the rate has gone much higher. It has been conceded that a a rate of 120 lb. of coal per square foot of grate is a figure which should not be exceeded, and numerous tests indicate that if a lower rate of combustion could be secured increased boiler efficiency would result. To sum the matter up, further development and extension of locomotive power is dependent upon adequate methods of taking care of larger grate areas and firebox heating surfaces than present construction allows.

Fig. 2 gives a good idea of the influence of the rate of combustion upon locomotive performance. This curve shows total water evaporated plotted against dry coal fired per hour in pounds per square foot of grate for a Mikado type locomotive. There is a break in the curve after about 130 lb. per square foot of grate per hour is reached. That the performance of the boiler is not limited by the ability of the heating surface to absorb heat is shown by the smokebox temperature curve. There is no break in this smokebox temperature curve at the point where the evaporation begins to fall off. This conclusively shows that it is a combustion condition that causes the falling off in rate of evaporation.

Using Fig. 2 as an example, suppose that we have a locomotive designed to burn 120 lb. of coal per square foot of grate per hour, and that this design is based upon using coal of 12,500 B. t. u. If the engine receives a tank of coal averaging 11,000 B. t. u., the rate of coal per square foot of grate per hour would immediately jump to 137 lb., at which point the curve is rapidly sloping away and proportionately a very large amount of coal must be added to secure a relatively small increase in total evaporation. Consequently the increasing rate of combustion interposes resistance to efforts to produce more power.

The condition thus cited is not an unusual one in railway practice. Reports show engines failing for steam on account of bad coal. As a matter of fact the engines failed because the rate of combustion had to be forced above the possibilities of the grate. If our locomotives were designed for about 100 lb. per square foot of grate per hour for an engine designed with the boiler proportions about as indicated in Fig. 2 we would be working on a portion of the curve where there is an even slope, and there would be a margin for the condition of poor coal.

These are test plant figures and it may be urged that they do not reflect road conditions. A road test on 4-8-2 class engine on an important road gives results as shown in Table I. The average of three runs with an average train shows that 91.17 lb. of coal were burned per square foot of grate for the time the throttle was open. The average of three runs with a heavy train shows that 124.79 lb. of coal were

TABLE I

RATE OF COMBUSTION AND EFFICIENCY FROM ROAD TESTS OF 4-8-2 TYPE LOCOMOTIVE

| Run No. | Coal per sq. ft. Grate time Throttle open | Boiler efficiency (Dry coal basis) |
|---|---|---|
| 2 | 92.13 | 61.05 |
| 4 | 88.57 | 62.04 |
| 6 | 92.82 | 62.05 |
| Average | 91.17 | 61.71 |
| 10 | 124.76 | 55.51 |
| 12 | 129.36 | 51.01 |
| 14 | 120.26 | 57.93 |
| Average | 124.79 | 54.82 |

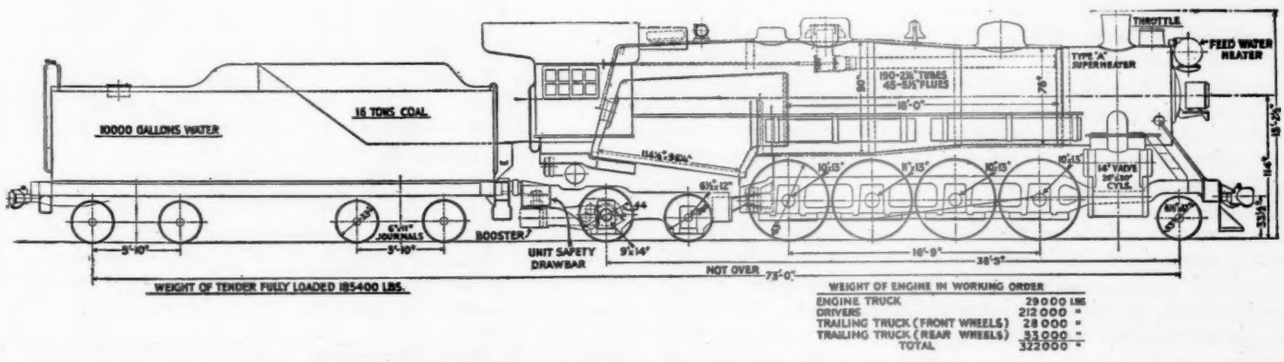



**Fig. 3—Proposed Design to Overcome Firebox Limitations**

burned per square foot of grate for the time the throttle was open.

This indicates conclusively that in actual practice we are duplicating test plant conditions set forth in Fig. 2. It is also important to note that the average boiler efficiency for the lower rates of combustion was 61.71 per cent, whereas when the boiler was forced and the rate of combustion was 124.79 lb. per square foot per hour the efficiency of the boiler fell off to 54.82 per cent. Grate area has become the most important single limiting factor in locomotive development. How to increase it and still meet wheel load conditions is the problem locomotive designers are facing.

The locomotive design illustrated in Fig. 3 shows a proposed solution of the problem which has not yet been worked out in practice. This is the result of a large amount of study and planning. It is designed to permit of any desired size of firebox within ordinary limits of width and length. Stokers can be used and the booster applied and still not exceed prevailing trailer load limits. Fundamentally, the design consists of an articulated frame, the articulated point being placed back of the rear driving wheels. The frame members under the firebox are placed outside of the trailing wheels, thus giving maximum ashpan space and permitting a very easy and desirable booster, stoker and foot plate application. The cab, ash pan and cab parts are carried on supports attached to the boiler mudring. Suitable bearings are placed at the rear of the firebox connecting with the articulated frame members.

This design removes the limits imposed by the single trailing axle. It permits of a grate and firebox design to suit any coal conditions and any desired rate of combustion; it allows an increase in ashpan capacity of from 75 to 100 per cent. It reduces to a minimum the lateral offsets on curves between the rear engine frame and the tender.

This Lima 2-8-4 type locomotive was designed for a limiting load of 54,000 lb. per axle. It has the following principal characteristics:

| Weights in Working Order | |
|---|---|
| Engine truck | 29,000 lb. |
| Drivers | 212,000 lb. |
| Trailer unit (front wheels) | 28,000 lb. |
| Trailer unit (rear wheels) | 53,000 lb. |
| Total | 322,000 lb. |
| Heating surface, firebox syphons and arch tubes | 375 sq. ft. approx. |
| Heating surface, tubes and flues | 3,162 sq. ft. |
| Heating surface, total | 3,537 sq. ft. approx. |
| Superheating surface | 915 sq. ft. |
| Grate area | 76.2 sq. ft. |

History repeats itself. In 1895 the Chicago, Burlington & Quincy found its rate of combustion mounting to 200 lb. of coal per square foot of grate per hour. Engine No. 590 with a wide firebox reduced it to 112 lb. to do the same work. We have again reached the firebox, the grate area limit. We are again forcing locomotives beyond the point of economical operation. We are burning coal at from 140 to 180 lb. per square foot of grate area per hour. Think back to the arguments that brought wider fireboxes 25 years ago. Furnace limitations brought improvement then. They call for improvement now. We caught up then by adding a trailer axle.

Another trailer axle appears to be our recourse now. Other improvements have delayed this necessity but we must now catch up with the improvements.

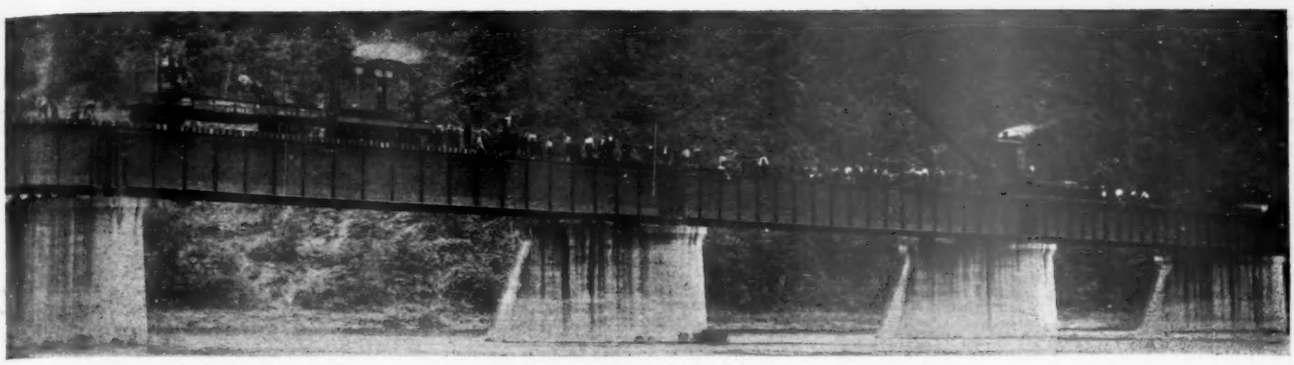
Locomotive wheel action on the rail calls for a study of the wave effect of the weights imposed by the various wheels. Fiber stress in rails is affected by two things other than speeds: first, the weight on each individual locomotive wheel and, second, the distance between the points of application of those weights. Progress of the locomotive on the track produces waves in the track. The track reacts, as much as it has time to react, after each wheel passes. Trailing wheels are far enough behind the drivers to allow the track to spring upward behind the rear drivers. The trailers knock it down again. Because of this, trailer weights are most important and so also is the distance between the trailer wheel and the rear driver. If trailer wheels carry say 75 per cent of the average weight on driving wheels the rail stress produced by the trailers become almost as great as the stress from the drivers themselves (American Railway Engineering Association Proceedings, Volume 21, 1920, page 719). This strongly supports the suggestion of four wheels under the firebox with wheel spacing and wheel loads that will prevent the destructive track effect of present trailer practice by an additional pair of wheels which will tend to keep the track down until the second trailer axle has passed. The four wheel articulated trailer promises to help to answer this rail stress problem.

You in the west are burning oil, but some day you may be faced with the necessity for burning lignite. That is what this firebox question may mean to you.

Tradition says that the locomotive must be as simple as a grindstone. Railroad operation today says that it must be powerful and efficient. Power and efficiency in locomotives are not to be had except by complication, by adding to the locomotive factors that increase power that can not be added in any other way and factors that save waste that can not be saved in any other way. Every one of these factors increases weight. This weight must be provided for. In my opinion the four-wheel articulated trailer is the solution. We have put the additional carrying wheels under the wrong end of the engine. Why not put them where they are most needed, under the business end, under the firebox?

*From the Chicago Post*

**Wouldn't It Be a Good Idea to Build Up His Strength a Little Before Performing Another Operation?**



*Renewing Bridge Ties with Cranes Hastens Work.*

# Mechanical Equipment Saves Men and Money

## Lehigh Valley Has Reduced Maintenance Costs by Substituting Machinery for Labor

**By G. L. Moore**
Engineer Maintenance of Way, Lehigh Valley, Bethlehem, Pa.

SOME OF THE METHODS or operations which have been adopted on the Lehigh Valley during the last 14 years and which have effected substantial economies are listed in the following, in a fair approximation of the order in which they came about.

1. Sub-drainage for all wet cuts.
2. The use of rail anchors on all tracks subject to creeping.
3. The use of creosoted ties and switch and bridge ties.
4. The use of tie plates wherever ties would otherwise be damaged by rail cutting.
5. The discontinuance of the spacing of joint ties to fit the spike slots in the joints.
6. The thickening up of the ties in heavy traffic tracks. (The use of 20 7-in. by 9-in. by 8½-ft. ties under a 33-ft. rail.)
7. The laying of new rail in the winter months.
8. The handling of all rail, timber and other bulky or heavy material with locomotive cranes, steam derricks, air lifts, ditchers or other forms of lifting machinery.
9. Taking over the track when laying new rail, laying a large amount in one day, while detouring trains on other tracks.
10. Laying the rail with locomotive cranes instead of by tongs gangs.
11. Renewing bridge ties with locomotive cranes, taking over the track the same as when laying rail.
12. The use of four-tool, pneumatic tie tampers.
13. The use of pneumatic drills for bonding rail.
14. The adoption of the 136-lb. L. V. rail section in 1916.
15. The use of tie plates under all 136-lb. rail laid to cant the rail inward 1 to 20.
16. The use of pneumatic track wrenches.
17. The use of 12-tool pneumatic tie tampers.
18. Portable saw mills.
19. Cleaning ballast with locomotive cranes.

Many other items of importance were developed in carrying out these ideas which this article will not attempt to cover fully; neither will it attempt to describe the organization of the working forces in the different operations. Rather attention will be confined generally to some of the items listed above, omitting further special reference to those things which are now being done on most of the large railroads.

### Tie Plates, Creosoted Ties, Rail Anchors and Elimination of Respacing

In 1910 the treating plant at Manville, N. J., was placed in operation. In 1922 less than 30 per cent of the number of ties that constituted the annual renewals before the treatment of ties was begun were renewed, while 1923 requirements are estimated at 25 per cent of the number formerly required per year. About 67 per cent of the ties now in tracks are creosoted.

During an inspection trip over the road one spring many years ago it seemed that the stone ballast was being pushed up between the ties at every joint by the movement of the joint ties. Ties were found badly split by the spikes in the slots of the joints by reason of the creeping of the rails. This was just about the time of the development of efficient and practical rail anchors. It seemed to us that there was no sense in letting the rails creep and ruin the track if it could be prevented, and we began applying rail anchors.

With the results obtained from the use of the rail anchors it was seen that the slewing of the ties by fastening the joint ties with the spikes through the slots in the joints could be obviated. It was no longer necessary to depend upon the joint ties to hold the rails for the very last ties that should have such a strain were the joint ties. Then the question arose as to why, when laying new rail, the ties should be loosened up and driven off their old beds to fit spike slots in the joints when we ought not to spike through the slots? Why should the ties be respaced every time rail was laid? Did it not do more harm than good?

In looking over other roads it was noted that one of the largest roads would not use a joint of the suspended type, while another prominent road would not use a joint of the supported type, and both roads maintained excellent track. Why should we not be satisfied with joints as good as either road had? Would we not obtain the advantage of leaving our ties on their old hard beds and avoid loosening them, and surely would not the greater cost of labor for shifting the ties be saved? It was concluded to non-space the joint ties and to stop having the joints slotted for spiking. The results obtained from this practice during the last ten years have been all that were expected.

Prior to this, it was concluded that there should be 20

ties under each 33-ft. rail on heavy traffic tracks. Where the breaking of the joints of the rails came within six inches of the opposite center, in thickening up the ties and resurfacing the track, the joint ties have been placed so as to fit the joints; in other places in doing this same work where the breaking of the joints was not accomplished so accurately, the ties have been spaced evenly without regard to the location of the joints. The track put up in these two ways has been watched carefully. If there is any man who believes he is able to tell which stretches of track stay up the best with the least work and generally give the best results he is not on the Lehigh Valley.

### Laying Rail in the Winter Reduces Summer Load

The fact that efficient and practical anti-creepers were available for use and the non-spacing of joint ties, made the laying of the rail in the winter time practicable. The reasons which have led to the adoption of this practice are ones only of economy and efficiency.

It is necessary to retain a certain force to take care of winter emergencies. We employ from two to three men per section during the winter on our heavy traffic main line outlying sections, and from one to two men per section on light branches. On yard sections and those having many switches to look after, a proportionately light force is employed; a limited number of small extra gangs are retained. Economical operation dictates that these light forces which must be kept during the winter should be employed on constructive work as far as possible. A certain amount of snow and ice must be removed and the road must be kept open, but when the absolute necessities of such work are exceeded, the money that is being spent might just as well be thrown into the river for all the good that it does.

I have often been asked if it does not cost more to lay rail in the winter than in the summer. It does, but what of it? Real constructive work is being done and when spring comes the road is that much ahead. Our rail has been laid in the winter for the last ten years or more. We are particular with the adzing and the use of light shims where necessary and the rail suffers no damage.

### Eliminating Traffic Interference Increases Output of Rail Laying Gangs

In making every effort to secure the best results from work trains unloading and picking up rail, unloading ballast, ties, etc., on a multiple track line, it was found that in many instances other trains could be run around the work train and thereby substantially increase the amount of work accomplished by the work train and yet not cause any serious delays to the others. With the co-operation of the superintendents and transportation officers it was but a step to run the trains around when laying rail and as trials of this method proved very advantageous at once, it was adopted immediately. This was before the practice of laying rail with machines was begun.

Under the old methods of laying rail under traffic there were delays to individual trains and little was accomplished by the rail-laying gangs on some days on account of the traffic. In taking over the track and running trains around on the other track a full day's work is always secured and the delays to trains are confined to the one day. The cost of laying under this method is only a fraction of the cost of laying under traffic.

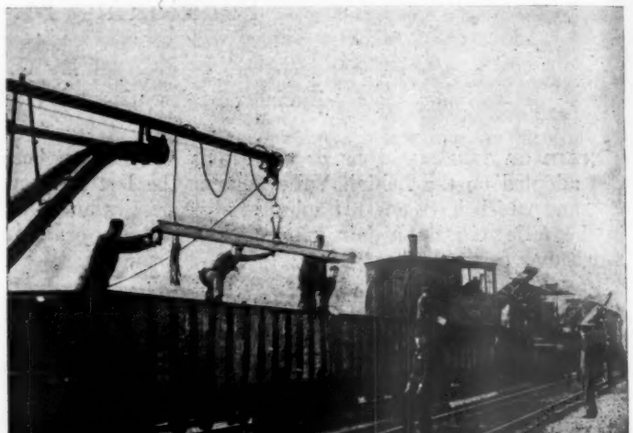
One day in January, 1913, shortly after this method had been adopted, new 110-lb. rail was laid on No. 1 track from Richards to Bethlehem, Pa., a distance of eight miles. The actual laying of the rail was completed early in the afternoon and before the end of the day the track was thrown open to traffic, fully bolted, fully spiked and fully bonded with all automatic signals working. In following this method the trainmaster personally takes charge of the movement of the traffic on the ground and the division engineer and track supervisors personally take charge of the track work.

We start with a track complete in every detail and turn back for traffic a track complete in every detail at the finish. There is no transportation officer on this railroad who would not object most strenuously to a return to the old methods, because they have found out that under this method the delays to trains because of laying rail have been reduced to the minimum.

### Locomotive Cranes, Pneumatic Drills and Pneumatic Wrenches in Laying Rail

Having adopted the method of detouring trains around the rail laying operations, the thought presented itself why, when all rail was unloaded and loaded with machines, the same machines should not also do the heavy work in connection with the laying of the rail. A study was made of the best way of using locomotive cranes to replace the tongs gangs. The plan was a decided success from the start, and as the locomotive crane engineers became more proficient in this particular work, the results greatly exceeded expectations.

The rails are swung in at the rate of two or more a minute,



**All Rail is Handled by Cranes or Derricks**

the machine tireless and working as fast while laying the last rails as when laying the first ones; it is efficiency at its best. It is not a question of how fast the locomotive crane can lay rails; the question as to how many cranes to use depends upon how many men can be gathered together economically for the work. One crane will keep 200 men very busy.

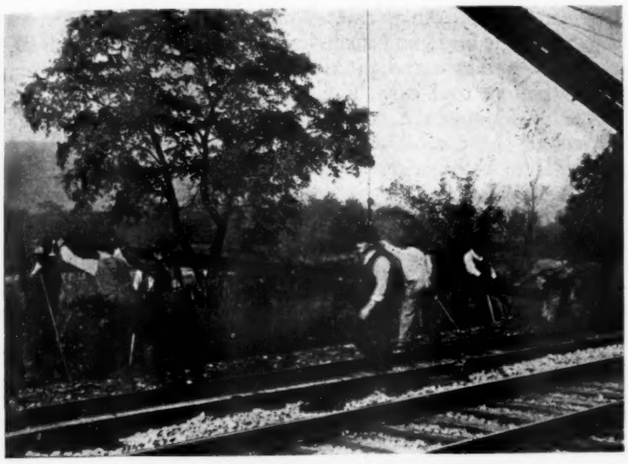
Further economy and efficiency in this work must depend upon the other measures which can be adopted to reduce the number of men required per crane. There is where the power drilling machines for drilling holes for the bond wires come in. This road uses self-propelling tie-tamper air compressors to furnish air for the drills. Where the drilling for the bond wires with the hand drills was once one of the branches of the work which decided how much rail could be laid in a day, the use of the air drills has changed all this; numbers of men formerly employed to operate the hand drills are released for other work and there is no difficulty in keeping the drilling close behind the actual laying of the rails. It also permits the laying of more rail in a day because the men released here are available for other branches of the work which now limit the amount of the daily output.

Pneumatic wrenches have been operated in the same manner as the pneumatic drills. There is an added advantage in these wrenches in that they can be used to run the nuts

off the bolts of the rail that has been changed out of the track. These wrenches also release men for other work and thus add to the efficiency and economy of the whole operation. A kink that will facilitate winter rail laying is to equip the work train engine so that a steam blast can be directed along the rails to dissipate the snow and ice in advance of the work.

### Renewing Bridge Ties With Locomotive Cranes Facilitates Work

On the Delaware and the Susquehanna river bridges it was formerly a full season's work to renew the ties on one



**Placing a Rail Every Thirty Seconds**

track while working under traffic. With our present methods we have replaced all of the bridge ties on one track on these bridges in one day by taking over the track, detouring trains over the other track the same as when laying rail and using locomotive cranes to handle the ties. The Delaware river bridge is 1,103 ft. in length, and the Susquehanna river bridge is 1,808 ft. long. This same method has, of course, been adopted on smaller bridges. Also, where necessary to renew the track stringers of some of the steel bridges, a track

**A Twelve Tamper Machine in Action**

a day has been renewed by the same methods, the larger part of the riveting being done on subsequent days.

### Pnuematic Tie Tampers Aid Section Work

The four-tool tamper machines were first used by this road in 1916. Last season 12-tool tamper machines were first put into use. Past usage had shown economy in many instances by using two or three of the four-tamper compressors as a battery and operating 8 or 12 tie tampers together. It was expected that greater economy would be obtained if one unit was used to operate 12 tampers and the experience during last year has proved this to be the case. The compressors can be used for many other purposes also, such as operating other kinds of air tools in both the track and bridge sub-departments, operating concrete guns, pumping water by air lift in emergencies, pumping up train lines at outlying points, etc.

We have definitely proved to our own satisfaction that we are getting the tampering done better and at less than half the cost by the use of the pneumatic tampers. With modern enormous wheel loads and traffic, the track must be made as solid as possible and hand tamping does not produce as good results as are accomplished with pneumatic tampers.

### Heavy Rail Decreases Amount of Labor Required for Track Maintenance

The benefits obtained by this road from the increased strength of the 7-in. 136-lb. section over the 6-in. 100-lb. section has been found by experience to be most pronounced. Our track laid with the 136-lb. rail stays in good line and surface better and much longer than does the track laid with the 6-in. 100-lb. rail. The use of heavier rail also effects a saving in material by increasing the life of the rail from mechanical wear by the wheels by reason of our being able to improve the wearing qualities of the steel by making it of higher carbon and by proportioning the head of the rail so as to offer a full bearing area for the flanges of the wheels against the head of the rail.

In 1915, after giving careful consideration to the whole subject, it was decided that a rail seven inches high was needed. The conclusion was also reached that a rail that high would meet requirements for the future. It was decided to go to the largest rail that was needed and would prove most economical, at one jump instead of stepping up to it by increasing the size of the section every few years.

We first decided that a rail 7 in. high was wanted. The rail was then proportioned to fit that height with a head which it was believed would give the best results. Believing that economical maintenance required a wide base, the base was made 6½ in. wide. We also decided to use tie plates with a sloping top to cant the rail in on an inclination of 1 to 20. The rail stays in the position laid, it does not roll out; the track forces do not have to do any re-adzing or regaging in spite of the fact that the Lehigh Valley has an excessive amount of curvature and very sharp curves on a portion of its lines.

Laying of the 136-lb. section was begun in 1916 on the crooked part of the road, but after this rail had been in use a short time the buying of new rail of a lighter section was

discontinued. At the present time 385 miles of track are laid with 136-lb. rail.

We expected to make a large saving by increasing the life of the rail, especially on curves, and also by reducing the amount of work required to maintain the line and surface. We have not been disappointed in either respect. We have records of the 136-lb. rail giving more than twice the life on curves under increased traffic than was obtained from the A.R.A. 100-lb. Series A rail, and we have 10-deg. curves laid with this rail where no work was required in four years to readjust the line and surface. The rails were transposed during that time from the high to the low side of the curves and from the low to the high side of the curves, but no other track work was done or required.

In our opinion, nothing is gained by making the head of the rail abnormally wide or thick. On the low side of curves the rail will roughen up before it gets too thin and should be transposed to the high side while still fit for such use. Rails of abnormally wide head have been tried and found to be objectionable on the low sides of curves. The best methods of maintenance justify the use of a section with a normally heavy head and the transposing of the rails on curves before they become worn rough so as to be unfit for transposing.

An examination of the wear of the high rails on curves with a head 1⅞ in. thick shows that the wheel flanges do not wear the lower corner of the head prior to the time that the rail is transposed to the lower side of the curve, where, when so transposed, it makes a better low side rail than does new rail. Therefore it seems that nothing is gained by using rail with heads of abnormal size and that the advantage in the use of heavier rails must be to secure added girder strength of the section.

While the heavy section protects us to a great degree from the extreme hazards due to rail failures, it does not relieve us from all anxiety on that account. The 136-lb. rail has given excellent satisfaction from the standpoint of rail failures except as regards two of 29 rollings. We have received and laid in track 87,505 tons of first quality 136-lb. rail. From one rolling representing 6.73 per cent of the total tonnage we have suffered 57.15 per cent of our total failures, and from two rollings representing jointly only 8.7 per cent of the total amount of rail rolled we have suffered 90.93 per cent of the total number of failures of all the rail rolled. We have 20 rollings representing 74.93 per cent of the total rail rolled in which there have been no failures. The explanation of this will not be found to be in differences in the amount of carbon in the steel or in the chemical analysis of the steel as rolled. The mill people have shown every disposition and desire to furnish the best rails and the conclusive reason for most of the failures occurring in these certain rollings has not as yet been developed.

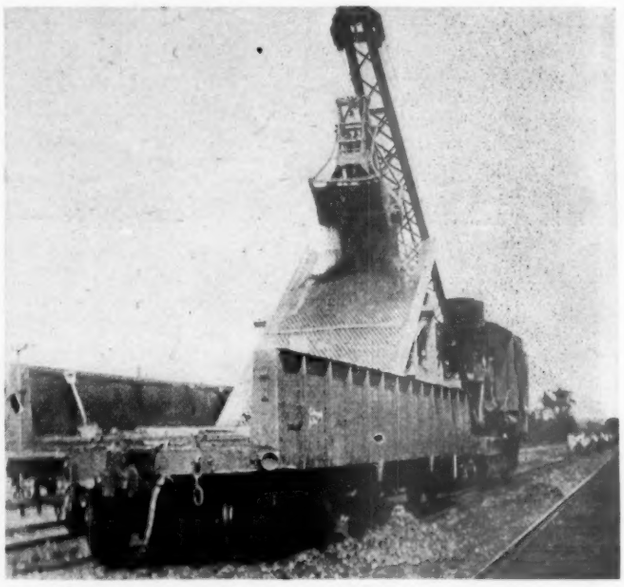
When the 136-lb. section with a 6½-in. base was adopted we were not entirely free from anxiety as to whether it would be necessary to pre-curve the rail to fit the sharp curves, but in practice no difficulty had been found in this respect. The rail is not pre-curved and it lays just as easily and readily to conform to the sharp curves as does the 100-lb. rail and it stays as laid.

As far as cost is concerned, what the rail weighs per yard does not count as much as the aggregate weight of the rail put in per year. Going back to 1905 when the road was largely laid with 80-lb. rail, and 90-lb. rail was the heaviest, and arriving at the average renewals per year in tons, it is noteworthy that, although the laying of 136-lb. rail was begun in 1916, a less tonnage of new rail was laid in 1921 and 1922 than the average of former years, and our budget for 1923 renewals also provides a decreased tonnage. Our traffic has increased substantially, the wheel loads are much greater, and our tracks are in a greatly improved condition.

Tie plates inclined 1 to 20 have been used with all new rail laid for the past six years and the results are proving all that was expected. Joints are not spike slotted and the same plate is used at joints and on intermediate ties. At the turnouts the inclined plates are used under all rails except the switch rails. At the switches the flat switch plates are installed. No trouble is found in adjusting the difference in position of the rails from the vertical to the inclination of 1 to 20. When the use of inclined plates was started we were concerned about the switches, but we have encountered no trouble in getting and maintaining a proper fit.

### Ballast Is Cleaned With Locomotive Crane

Screens made from worn coal breaker screens, worn screens from rock crushers, and sometimes from second-hand plates, are put in a frame and placed in the end of a non-clearing hopper bottom coal car. The foot of the screen is near the hopper opening in the floor of the car and the top is above the end of the car. The locomotive crane digs up the foul ballast from between the tracks to a depth of six inches or more below the bottom of the ties and deposits it on the screen near its top. The clean stone rolls down the screen into the hopper of the car and thus to the track, while the dirt drops through the screen to the floor of the car and is later removed and unloaded along the bank for a shoulder at some point near where needed. The flow of the clean ballast is, when desired, deflected by gates so that the stone falls between the tracks instead of through the hopper between the rails.



**Cleaning Ballast with Locomotive Crane Expedites Work**

The space between the ties of the tracks is dug out by hand ahead of this operation and the material cast between the tracks for loading by the crane. As large a number of cranes and screens are used in one train as are available. Long stretches of track are cleaned in a day. One crane sometimes cleans as high as 40 rail lengths thoroughly. In many instances when working near a siding no work train engine is used, as the self-propelled cranes can readily clear the running track. The economy of this operation over cleaning by hand is most pronounced and the ballast is cleaned to a greater depth than ordinarily done by hand.

### Spirit of Rivalry Promotes Efficiency

This article would not be complete without mentioning one of the greatest results of our methods. We always advertise to all divisions any particular achievements of other divi-

sions. When results obtained by work trains in unloading new rail and loading relaying rail as accomplished, resulting finally in a high mark of 16 track miles of relaying rail picked up in one day by one work train, are thus advertised, the spirit of friendly rivalry is developed. These work trains have had as high as eight self-propelling machines in one train. The same spirit is promoted by advertising results accomplished in laying new rail. By reason of this friendly rivalry all of the division officers have been continually searching for improvements in the different operations and for new methods, and the "esprit de corps," reaching way down in the ranks of the maintenance of way department which has resulted, has a value far beyond computation.

# Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING during the week ended February 24 showed an increase of over 12,000 cars as compared with the preceding week, in spite of the fact that the week included the Washington's Birthday holiday. The total, 830,223 cars, also kept up the record which has been maintained since the end of November of exceeding the figures for the corresponding weeks of previous years. As compared with last year, the increase was 101,298 cars and compared with 1921 it was 170,581. The loading of grain and grain products was less than in the corresponding weeks of 1922 and 1921 and the loading of coal, which has been falling off for the past two weeks, was 8,183 below the corresponding week of last year. All other classes of commodities showed increases over both of the two preceding years. Loading of miscellaneous freight was 72,146 cars in excess of that for last year. In the Pocahontas district the loading was less than that for last year and in the southwestern district the loading was less than for the corresponding week of 1921.

Total freight car loading for the eight weeks ended February 24 this year amounts to 6,747,261 cars, as compared with 5,867,380 for the corresponding period of last year. This is an increase of 15 per cent. It also is an increase of 363,547 cars as compared with the loading for the corresponding period of the record year 1920, when the total was 6,383,714.

Increased demand for freight cars of nearly all classes was reported for the period ended on February 15, compared with that from February 1 to 8. The shortage averaged 76,900 cars, or an increase in a week of 4,045 cars. The shortage in box cars amounted to 30,087 or an increase within the same period of 2,887, while the shortage in coal cars totaled 39,197 or 1,065 above that on February 8. Surplus freight cars averaged 20,786, a decrease of 6,386.

Freight cars on February 15 totaled 97,932, according to reports received by the Car Service Division. This was an increase of 29,600 over the number on order on January 1 and an increase of 6,578 over the total on order on February 1. Of the total, 49,646 were for box cars and 37,680 were coal cars. Up to February 15 orders had been placed for 1,915 locomotives, which was an increase of 470 over the number on order on January 1 last, including 1,407 freight locomotives, 376 passenger and 132 switch engines.

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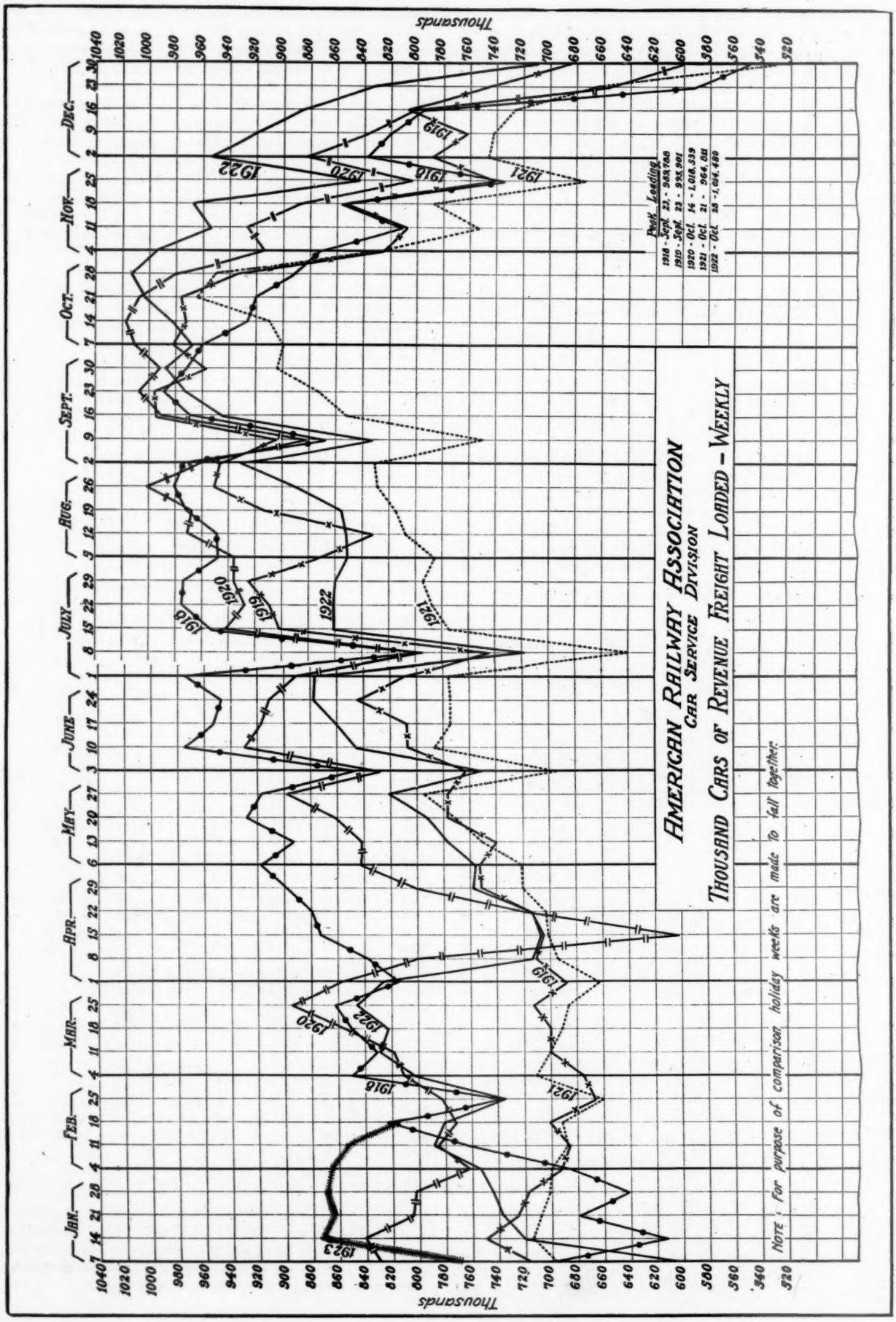
COAL MINED IN CANADA during the twelve months ending January 31, 1923, totalled 42,000 tons of anthracite, 11,361,465 tons of bituminous and 3,524,000 tons of lignite, according to a statement in the House of Commons by Hon. A. B. Copp, Secretary of State. During the year 1,526,106 tons of Canadian coal were exported to the United States. Discussion concerning the amount of anthracite from the United States consumed in Canada has called attention to the fact that the available anthracite in Canada is more than 1,000 miles east of Montreal.

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, FEBRUARY 24, 1923

| Districts | Year | Grain and grain products | Live stock | Coal | Coke | Forest products | Ore | Mdse. L.C.L. | Miscellaneous | Total revenue freight loaded | Corresponding period 1922 | Corresponding period 1921 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eastern | 1923 | 6,754 | 3,394 | 50,284 | 3,757 | 5,514 | 1,939 | 49,703 | 73,401 | 194,746 | ..... | ..... |
| | 1922 | 8,905 | 2,549 | 46,154 | 1,801 | 4,894 | 720 | 56,725 | 57,748 | ..... | 179,496 | 150,360 |
| Allegheny | 1923 | 2,643 | 2,770 | 48,585 | 6,668 | 3,280 | 1,502 | 42,543 | 66,689 | 174,680 | ..... | ..... |
| | 1922 | 3,671 | 2,404 | 55,950 | 3,898 | 2,511 | 950 | 41,016 | 47,815 | ..... | 158,215 | 130,874 |
| Pocahontas | 1923 | 242 | 79 | 19,695 | 638 | 1,598 | 201 | 5,463 | 3,477 | 31,393 | ..... | ..... |
| | 1922 | 278 | 75 | 26,924 | 217 | 1,116 | 25 | 5,373 | 3,156 | ..... | 37,159 | 21,674 |
| Southern | 1923 | 3,801 | 2,222 | 23,307 | 1,346 | 22,693 | 1,593 | 36,790 | 47,156 | 138,908 | ..... | ..... |
| | 1922 | 3,716 | 2,135 | 24,162 | 585 | 16,337 | 539 | 33,717 | 33,706 | ..... | 114,897 | 112,155 |
| Northwestern | 1923 | 12,869 | 10,532 | 9,493 | 1,994 | 19,266 | 930 | 23,480 | 29,491 | 108,055 | ..... | ..... |
| | 1922 | 10,996 | 7,917 | 6,783 | 1,158 | 11,120 | 481 | 19,418 | 19,203 | ..... | 77,076 | 89,767 |
| Central Western | 1923 | 10,221 | 11,573 | 21,465 | 382 | 8,773 | 3,786 | 30,878 | 43,513 | 130,591 | ..... | ..... |
| | 1922 | 14,399 | 10,504 | 21,873 | 364 | 5,014 | 934 | 28,790 | 31,156 | ..... | 113,034 | 99,993 |
| Southwestern | 1923 | 3,834 | 1,890 | 5,628 | 128 | 8,767 | 469 | 12,533 | 18,601 | 51,850 | ..... | ..... |
| | 1922 | 4,838 | 1,945 | 4,794 | 107 | 6,393 | 701 | 12,872 | 17,398 | ..... | 49,048 | 54,819 |
| Total western districts | 1923 | 26,924 | 23,995 | 36,586 | 2,504 | 36,806 | 5,185 | 66,891 | 91,605 | 290,496 | ..... | ..... |
| | 1922 | 30,233 | 20,366 | 33,450 | 1,629 | 22,527 | 2,116 | 61,080 | 67,757 | ..... | 239,158 | 244,579 |
| Total, all roads | 1923 | 40,364 | 32,460 | 178,457 | 14,913 | 69,891 | 10,420 | 201,390 | 282,328 | 830,223 | ..... | ..... |
| | 1922 | 46,798 | 27,529 | 186,640 | 8,130 | 47,385 | 4,350 | 197,911 | 210,182 | ..... | 728,925 | ..... |
| | 1921 | 41,132 | 27,045 | 142,998 | 8,034 | 50,492 | 7,223 | 179,577 | 203,141 | ..... | ..... | 659,642 |
| Increase compared | 1922 | ..... | 4,931 | ..... | 6,783 | 22,506 | 6,070 | 3,479 | 72,146 | 101,298 | ..... | ..... |
| Decrease compared | 1922 | 6,434 | ..... | 8,183 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Increase compared | 1921 | ..... | 5,415 | 35,459 | 6,879 | 19,399 | 3,197 | 21,813 | 79,187 | 170,581 | ..... | ..... |
| Decrease compared | 1921 | 768 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| February 24 | 1923 | 40,364 | 32,460 | 178,457 | 14,913 | 69,891 | 10,420 | 201,390 | 282,328 | 830,223 | 728,925 | 659,642 |
| February 17 | 1923 | 40,179 | 30,274 | 180,988 | 14,912 | 59,431 | 9,816 | 208,913 | 273,265 | 817,778 | 773,275 | 692,007 |
| February 10 | 1923 | 40,939 | 32,277 | 190,860 | 15,188 | 64,310 | 10,110 | 216,323 | 283,282 | 853,289 | 777,791 | 687,867 |
| February 3 | 1923 | 41,736 | 33,675 | 189,773 | 14,199 | 69,767 | 11,239 | 216,876 | 288,410 | 865,675 | 747,895 | 699,718 |
| January 27 | 1923 | 46,819 | 35,436 | 194,738 | 14,503 | 69,613 | 12,088 | 211,879 | 286,088 | 871,164 | 740,386 | 701,605 |

Compiled by the Car Service Division, American Railway Association.


AMERICAN RAILWAY ASSOCIATION
CAR SERVICE DIVISION
THOUSAND CARS OF REVENUE FREIGHT LOADED – WEEKLY
Peak Loading
1918 - Sept. 23 - 933,700
1919 - Sept. 22 - 935,901
1920 - Oct. 16 - 1,018,539
1921 - Oct. 21 - 964,611
1922 - Oct. 28 - 1,044,486
NOTE: For purpose of comparison holiday weeks are made to fall together.
Thousands
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1918
1919
1920
1921
1922
1923

# Digest of Transportation Statistics for 1922

## Vast Room for Improvement in Heavier Loading of Cars Thus Reducing Expenses and Increasing Car Supply

WASHINGTON, D. C.

THE CAR SERVICE DIVISION of the American Railway Association has issued an annual bulletin giving a statistical digest of related economic and transportation factors applied to the movement of the country's production during the year 1922 and prior years. A careful analysis of the trend of transportation factors, production, prices and shipments has been made to serve as a background of business and railroad conditions subsequent to the war period and to give individual railroads and shippers a competent guide, statistical reference and index to industrial and agricultural activity, together with the performance of railway transportation during 1922. The bulletin gives a compilation of the freight car loading by weeks for the past five years. In analyzing the performance of the railroads during the past year, the bulletin says, due consideration must be given to the disarrangements of industry and transportation caused by the coal miners' and shopmen's strike.

The cessation of mining in the union fields from April 1 to August 10 placed a tremendous volume of retarded coal tonnage upon the carriers at the very period of the beginning of one of the largest seasonal crop movements in the history of the country. The effect of the strike of shop employees on July 1 accentuated the difficulties encountered in moving this abnormal volume of business. But comparing the last six months of the last four years, it is noted that the total loading for 1922 in the period covering the shopmen's strike was only eight-tenths of one per cent less than that for the corresponding six months of 1920, in which occurred the record loading in the history of railroad operation. It is also pointed out that car loadings for the first weeks of 1923 have greatly exceeded any prior corresponding period and, if taken as a guide, point toward a record year in the volume of traffic to be handled by the American railroads. Attention is directed to the fact that the railroads handled in 1922 approximately 19.2 per cent more revenue ton-miles with 10.6 per cent less freight train miles than in 1914.

There is vast room for improvement, the bulletin says, in the heavier loading of equipment, thereby minimizing empty mileage and operating expenses, together with increasing car supply during periods of shortage. If the average load per car which prevailed during 1920 and 1921 had been secured in 1922, 132,440 less cars would have been required in the first quarter, 486,206 in the second quarter and 161,226 cars in the third quarter to handle the same relative amount of tonnage. Also, 125,000,000 empty car miles would have been saved and the available car supply would have been increased by approximately 3,000 per day. Trade units, storage capacities and distribution channels are referred to as paramount factors in promoting improvement.

Attention is directed to the large available surplus of equipment during the fall of 1918, the first seven months of 1919, the entire year of 1921, and the first eight months of 1922. Subsequent to August, 1922, the bulletin points out, car shortage throughout the country existed to a marked degree, "yet when freight car shortage was at its peak in October, 1922, this figure did not, in any way, approach the volume of surplus cars during preceding periods of less demand. Car surplus deductions are quite accurate because definite determination of the number of idle cars can always be made, but car shortage figures are never reliable and usually exceed the actual shortage in the requirements for transportation, due to the fact that invariably shippers will emphasize their demand for cars when an increase in the activity of industry and transportation is apparent. Periods of car surplus represent periods of idle capital. The increase of storage capacity, and a more orderly method of distribution of commodities will have a tendency to iron out the acute fluctuations in price levels and shipments, and will put at work more of the idle capital during surplus car periods and make less acute the transportation shortages which only exist during a few months of any year.

" 'Transportation shortage' rather than 'car shortage' is the term which correctly implies the lack of transportation to meet the full demands of shippers. 'Transportation shortage' means not only a shortage of cars but also a shortage of all kinds of railway and industrial facilities. Expansion in both railway and industrial facilities, not alone the installation of freight cars, is necessary to meet the full requirements of commerce. Attention should be further directed to the chart which indicates that where revenue freight loaded is on the decline surplus cars increase at a rapid rate and at the same time tons per loaded car and miles per car per day show a corresponding decrease. It should be understood that the decline in miles per car per day during periods of car surplus is, to a large extent, due to the inclusion of idle cars in computing these figures. The direct opposite occurs with the increase of car loading. This indicates that where shippers, because of transportation stringency, must load their cars to capacity, trade units, etc., are adapted to that program, but where a surplus of cars is available a marked and unfortunate decrease occurs in the full utilization of cars. Car shortage periods prove that cars can be loaded to capacity. If the same results were obtained during periods of car surplus it would produce a saving in empty car miles and a great reduction in operating expenses, with a resultant increase in transportation efficiency."

Statistics of cars and locomotives ordered during the past five years are given showing that the number ordered during 1922 was the largest reported in any year since 1916. These are referred to as representing a concrete evidence of the rapid strides being made by the railroads in increased facilities by the replenishment of old and the installation of new equipment. Statistics are given covering the production and shipments of Portland cement, lumber, coal, iron and steel, automobiles, livestock and grain. In connection with the latter, attention is directed to the improvement indicated in the financial condition of the American farmer in 1922 compared with the year of deflation in 1921. The total volume of farm crops as reported on December 1, 1922, had increased 32.2 per cent over 1921, while the total operating revenue from Class I railroads for 11 months of 1922 showed an actual decrease compared with 1921 of approximately one per cent.

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BOARDS OF TRADE and various organizations of business men in the maritime provinces of Canada have protested against the boundaries of the new regions into which the Canadian National has been divided. Their particular objection seems to be the placing of the western boundary of the Atlantic region at Rivere du Loup instead of at Montreal. Sir Henry Thornton has replied to the protest of these interests by calling attention to the operating difficulties which would arise if the boundaries were placed at Montreal and assuring the protestants that it is his desire to keep officers known and respected locally in charge of the Atlantic region. He asked that they give the present arrangement a trial at any rate, before condemning it utterly.

# The Railways as Purchasers

WASHINGTON, D. C.

THE RAILWAYS purchase directly one-quarter of the total output of coal in the United States and one-ninth of the total petroleum production, and directly and indirectly they purchase approximately 30 per cent of the iron and steel output, at least 25 per cent of the lumber produced, a considerable but indeterminable percentage of the copper and brass output and smaller percentages of many other products, according to a study made by Julius H. Parmelee, director of the Bureau of Railway Economics. This is included in a chapter of a report on unemployment and business cycles submitted by the Bureau of Economic Research to the President's Conference Committee on Unemployment Conditions.

For the purpose of ascertaining the extent of railway purchases of articles for which exact statistics do not exist, the larger railways of the United States were requested to report the number of physical units of various commodities purchased by them during each year from 1910 to 1915 as a fairly normal pre-war period, and the totals reported by 39 of the principal railways have been increased in the ratio which their trackage or operating expenses bear to the total percentage or operating expenses of all steam railways. The average operating expenses and trackage of these 39 railways were approximately 51 per cent of the total and it is believed that this method gives more accurate figures for the present report than have heretofore been ascertained in similar statistical compilations.

In discussing the railways as purchasers, the report says the purchase of new equipment is the logical starting point, for the reason that equipment represents the most complicated product bought by the railways and the direct purchase of equipment means the indirect purchase of iron, steel, lumber, copper, brass and countless other raw and semi-manufactured materials. To illustrate the extent of these purchases, statistics are given showing new equipment installed by Class I roads during each year from 1912 to 1921. It is shown, however, that an important development during this period has been in the direction of larger or more powerful locomotives and cars and a gradual shifting with respect to cars from wooden to steel construction. Between 1911 and 1921 the number of locomotives increased only 12 per cent, but their aggregate tractive power increased 45 per cent, and while the number of freight cars increased only 9 per cent, their aggregate capacity increased 26 per cent. The safety and comfort of passenger cars have also been increased through the installation of steam heat, electric light and safety devices and complicated safety devices are also being installed on locomotives and freight cars. More material is required per unit of equipment built and, consequently, a falling off in the number of units bought does not necessarily cause a corresponding decrease in indirect purchases of the basic materials.

A second important field of railway purchases lies in the construction of new trackage, main line, secondary and passing tracks, yard tracks and sidings. Rails, ties, ballast, tie-plates, spikes, joints, and many other materials are fundamental essentials for the construction of a mile of track. After giving statistics regarding the new mileage constructed, and the amount of cross-ties, spikes, ballast and rail required per mile, the report adds that railway growth during the past 20 years has proceeded along a somewhat different line than that of new construction. This has been the intensive development of existing facilities representing additions to equipment, construction of additional tracks and increases in such subsidiary tracks as yard tracks, industrial tracks, passing tracks, and the like.

Still a third general field of railway purchases is the construction of new bridges, station and office buildings, terminals, and the like. In this field lie also the improvement of a large group of facilities, such as the construction of large terminals, both freight and passenger, and of large shops equipped with better tools and better working facilities for employees; the electrification of tunnels, terminals and many miles of suburban and main line; the reduction of grades, elimination of curves, and introduction of signals and safety devices. Attention is directed to the fact that a large part of the work of new construction and improvement is done by outside companies under contract, for which statistics are not available, but that indirectly the railways are the motivating force and the ultimate purchasers.

As an approach from a slightly different angle, emphasizing even more strongly the magnitude of the railways in the buying field, the report then takes up the figures reported by the 39 railways, as mentioned above. This method omits the considerable amounts of materials used indirectly by the railways and directly and indirectly by railway employees, but on the basis of the best information available, estimates have been made of the quantities of various materials used indirectly at first hand by the roads. Due to endless ramifications, however, no attempt has been made to include either the goods used indirectly by the railways at second hand, as, for example, the coal used by iron and steel mills in producing railway steel, or the goods used directly and indirectly by railway employees.

Not only is the transportation of coal the most important factor in railway freight traffic, representing about one-third of the total tonnage handled, but the railways are also the largest single group of coal purchasers in the United States. From 1915 to 1920 the steam railways of the United States consumed an annual average of 143,290,000 net tons of bituminous coal, or 27.8 per cent of the total production, and 5,428,000 net tons of anthracite coal, or 5.9 per cent of the total production. For the two combined, the railways used 24.5 per cent of the total.

The amount of fuel oil consumed by oil-burning railway locomotives during the 10 years from 1910 to 1920 was 36,064,000 barrels per year, or 11.8 per cent of the total output of petroleum.

From 1910 to 1915 the railways purchased and utilized 2,580,000 net tons of steel rails each year and 2,565,000 net tons of other iron and steel products. It seems reasonable to assume, the report says, that the railways purchased directly some 12 to 15 per cent of the annual iron and steel production, taking no account of the iron and steel products that go into locomotives, passenger cars and freight cars, nor of the large amount used in new construction work which is handled under contract. It has been estimated, for example, that nearly 10 per cent of the iron and steel production goes into locomotives and cars alone and this, the report says, would make the total percentage of the iron and steel output consumed directly or indirectly for railway purposes not less than 30 per cent.

It is found impossible to ascertain with exactness the proportion of lumber output used by the railways because so much lumber goes into new equipment, large structures and buildings handled through outside contracts. But the percentage of lumber output utilized directly or indirectly by the railways is estimated as at least 25 per cent.

Of copper and brass products of various kinds, the railways during the period from 1910 to 1915 purchased an average of 74,000 net tons per annum. Other metals, chiefly aluminum, lead, zinc and tin plate, are purchased directly by the railways in comparatively small amounts, averaging less than 1 per cent of the total output each year. For cement, figures are available in a rather small way for the years 1911 to 1915. During this period the railways purchased directly about 3 per cent of the total output, but the cement used by contractors in railway construction is estimated to increase the total percentage consumed to above 5 per cent.

# Holden Proposes Four Western Systems

## Northern Roads Ready to Consolidate—Other Systems Grouped Around A. T. & S. F., S. P. and U. P.

WASHINGTON, D. C.

AS BRIEFLY OUTLINED in last week's issue, a plan for the consolidation of the western railroads into four systems of 30,000 to 35,000 miles each, a property investment of approximately $2,000,000,000 each, and each having access to the Great Lakes, the Gulf of Mexico and by two lines to the Pacific Coast, was suggested to the Interstate Commerce Commission by Hale Holden, president of the Chicago, Burlington & Quincy, at the hearing on March 1 on the commission's tentative plan grouping the western roads into seven systems. In urging the commission to permit the consolidation of the Burlington, Northern Pacific, Great Northern and Colorado & Southern, operating approximately 28,000 miles of line, whereas the commission's tentative plan proposes to combine the Burlington with the Northern Pacific, the Great Northern with the Chicago, Milwaukee & St. Paul and the Colorado & Southern with the Santa Fe, Mr. Holden had expressed the conviction that the tentative plan for the west must either be reduced in size, or go further and provide for somewhat larger systems, not limited to any restricted part of the western territory.

The operated mileage, investment in road and equipment, net railway operating revenue, and percentage earned in the year 1922 by the roads in the four suggested groups were shown by Mr. Holden in the following table:

| | Operated mileage | Investment in road and equipment | Net railway operating income | Per cent |
|---|---|---|---|---|
| Group 1—Burlington ..... | 30,219 | $1,996,358,033 | $70,915,235 | 3.55 |
| Group 2—Santa Fe ..... | 35,483 | 2,253,997,382 | 95,092,589 | 4.22 |
| Group 3—Southern Pacific. | 35,349 | 2,342,101,999 | 84,528,974 | 3.61 |
| Group 4—Union Pacific ... | 32,515 | 2,282,001,214 | 70,900,232 | 3.11 |
| Total ..... | 133,577 | $8,874,458,628 | $321,437,030 | 3.62 |

In summarizing the effect of the tentative plan, Mr. Holden said he thought genuine grounds for anxiety over the result if that plan be carried out had been shown, because of the Great Northern or Northern Pacific should be disassociated from Burlington and grouped with Chicago, Milwaukee & St. Paul, either thereby would become a competitor instead of a friendly connection and a large part of the competitive interchange which the Burlington has enjoyed would be handled over St. Paul rails and the Burlington interchange at Twin Cities, Sioux City and Billings would be heavily reduced. Also, he said, if the present independent lines in the southwest leading to St. Louis, Kansas City and Omaha are carried through to rest their base upon St. Louis and Chicago and other intermediate eastern gateways, leaving the Burlington lines at St. Louis and Kansas City without friendly connections, the Burlington interchange revenue at those great gateways would in a like manner be heavily reduced. The plan to incorporate the Denver & Rio Grande and Western Pacific with the Atchison, Topeka & Santa Fe would largely reduce Burlington interchange at Denver by depriving it of its only friendly connection at that point. If the Colorado & Southern be also grouped with the Santa Fe, the present north and south route between Billings and the Northern lines and Colorado and the Southwest would be seriously impaired and on east and west business between the Burlington and the Colorado & Southern there would also be a substantial loss. Mr. Holden's statement continued:

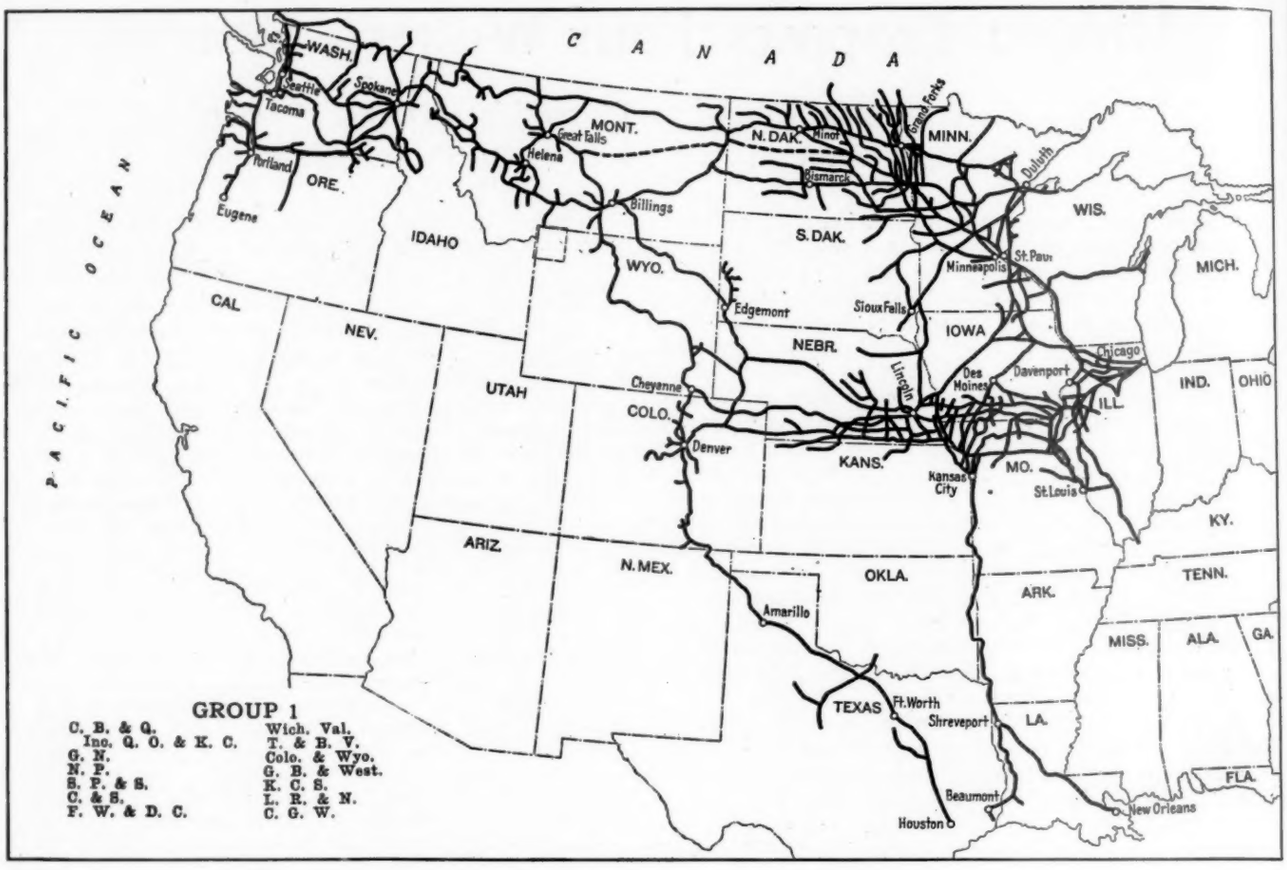
**The Burlington earnings, in a practical sense, underlie the great** bond obligation which Northern Pacific and Great Northern have incurred in the purchase and ownership of the Burlington. Viewing the destructive effect upon the Burlington of this plan and the serious disruption of established routes and channels of trade and commerce which affect the public interest, we have felt it necessary to point out that the Burlington seems to have been singled out in the tentative plan relating to Western territory, for treatment which will impair its stability and opportunity to grow and that through the weakening of the Burlington the Northern lines will be confronted with a financial problem of more serious consequences than they can undertake to face, and that these evident results offer no possible encouragement for voluntary action.

### Northern Lines Prepared to Consolidate

The Burlington, Northern Pacific, Great Northern & Southern lines have expressed their desire, and propose, if authority can be secured, to actually consolidate, and are here asking that they be grouped together as a preliminary step to that action. We have shown that important routes and channels of trade and commerce have long since been established over these lines and claim the right, under the statute, to have these continued. We have shown that the construction of the Chicago, Milwaukee & St. Paul line throughout the territory occupied by the Northern lines, taken with other existing important through lines, such as Chicago & Northwestern, Soo Line, Union Pacific and Southern Pacific, provide active competition for all but approximately 2 per cent of the total tonnage handled by the Northern Pacific and Great Northern together, so that the grouping of these lines for purposes of consolidation will in no way transgress the command of the statute that "competition shall be preserved as fully as possible." These primary requirements of the statute being thus provided for, we may say that certainly a prima facie case is made out, requiring urgent and controlling reasons to justify the disruption of present associations and of the financial structure of these companies and the loss of interchange revenues that would follow the reduction in the substantial volume of freight and passenger movement between them.

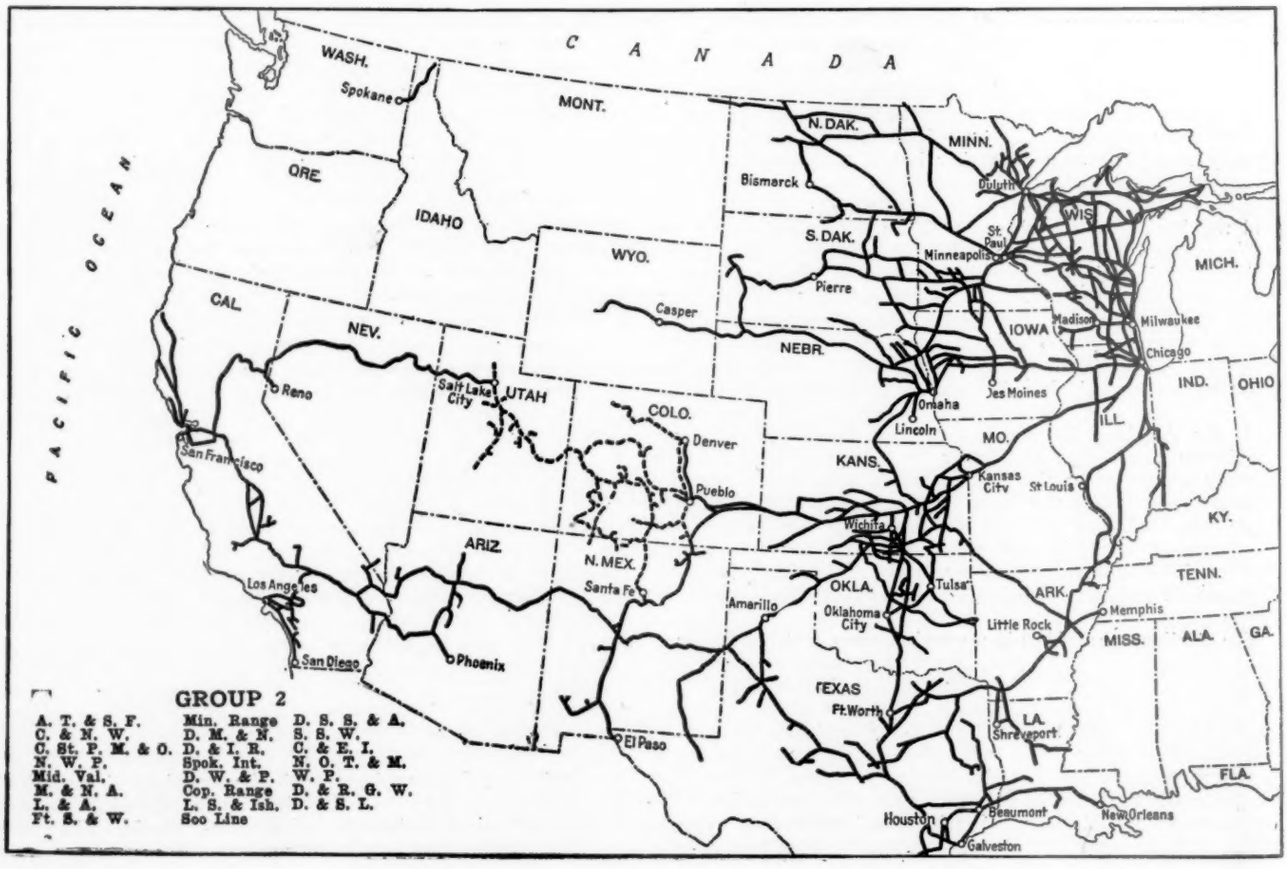
The reason which seems to have controlled the commission in the development of the tentative plan appears to be a problem of finding a suitable grouping for the Chicago, Milwaukee & St. Paul and to accomplish this that line has been grouped with the Great Northern. A study of the western railroad map has convinced me that there are several rational alternate suggestions which would indicate that the extreme measure of divorcing Great Northern from Burlington is not necessary. It has come to be understood that the policy of this new legislation in this, as in several other particulars, is based upon a survey of average conditions. Recognizing that this policy will, of course, produce individual conditions both below and above an average, other features of the law, such as the recapture clause, provide a method of handling surplus earnings beyond the maximum permitted, as well as for aid and assistance to individual lines unable to earn the stated group return.

The consolidation provisions of the act require that railway properties of the continental United States shall be grouped for purposes of consolidation into a limited number of systems. It would seem that these two provisions in the act must be considered together because when the consolidations are completed it would seem to follow that each consolidated property should be calculated and expected to present average conditions as nearly as may be, so as to earn the designated rate of return for the group as a whole. If this be not true, then the fixing of a rate structure for the western group involves the application of it to railroad systems widely divergent in type, character and location, and it becomes impossible, as I believe, for the rate regulating body to forecast with any degree of precision the probable results of the rate structure which it is required to establish and from time to time, as fundamental changes in the rate structure are called for, like uncertainty in the result presents itself. On the other hand, with consolidated systems having reasonably like conditions each to the other, a distinct element of accuracy in survey and calculation of results is afforded; and the establishment of rates calculated to earn the required rate of return is relieved of uncertainty. These views are well illustrated by the widely divergent results of the increase in rates authorized by the commission in Ex-Parte 74. The reason in this particular seems to be because some of the larger western



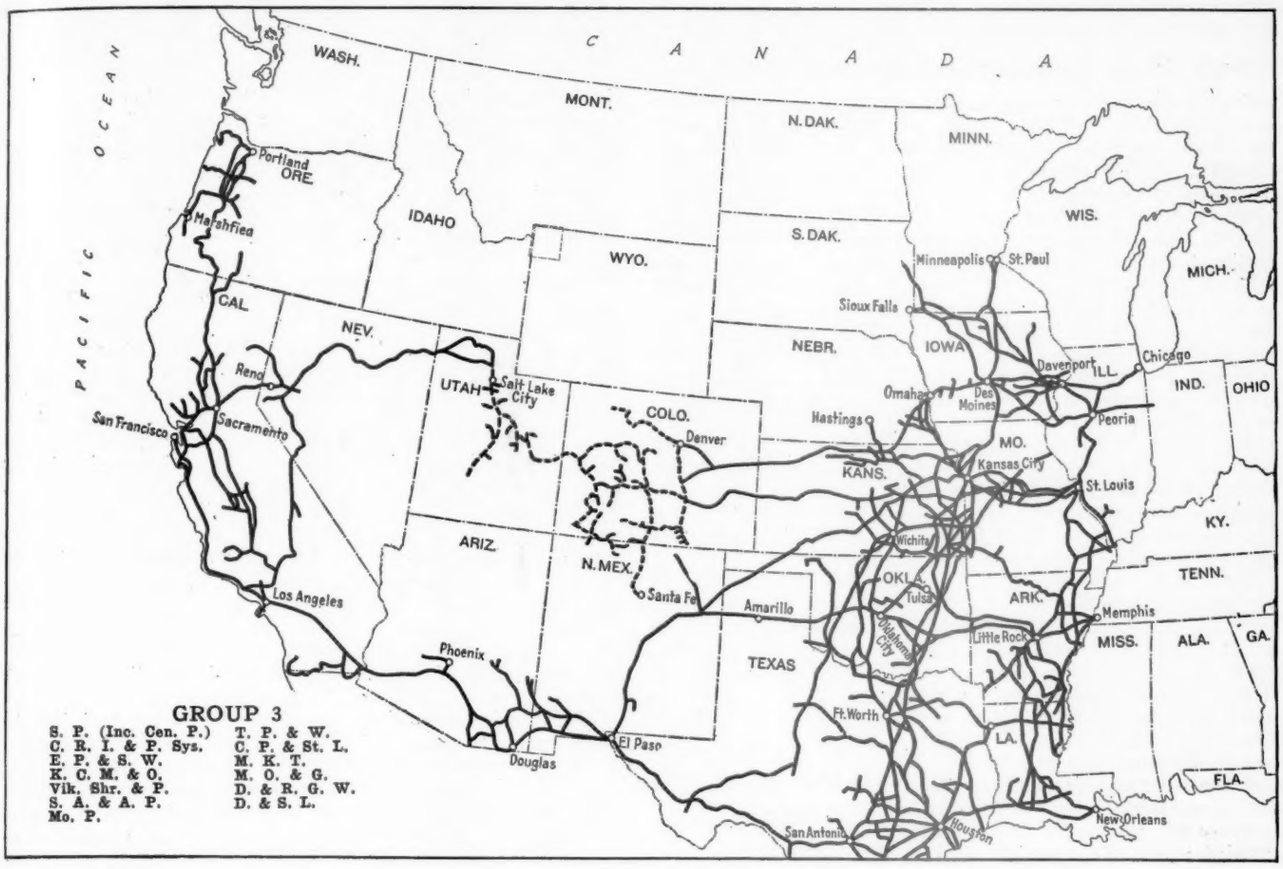

**GROUP 1**

| | |
|---|---|
| C. B. & Q. Inc. Q. O. & K. C. | Wich. Val. |
| G. N. | T. & B. V. |
| N. P. | Colo. & Wyo. |
| S. P. & S. | G. B. & West. |
| C. & S. | K. C. S. |
| F. W. & D. C. | L. R. & N. |
| | C. G. W. |



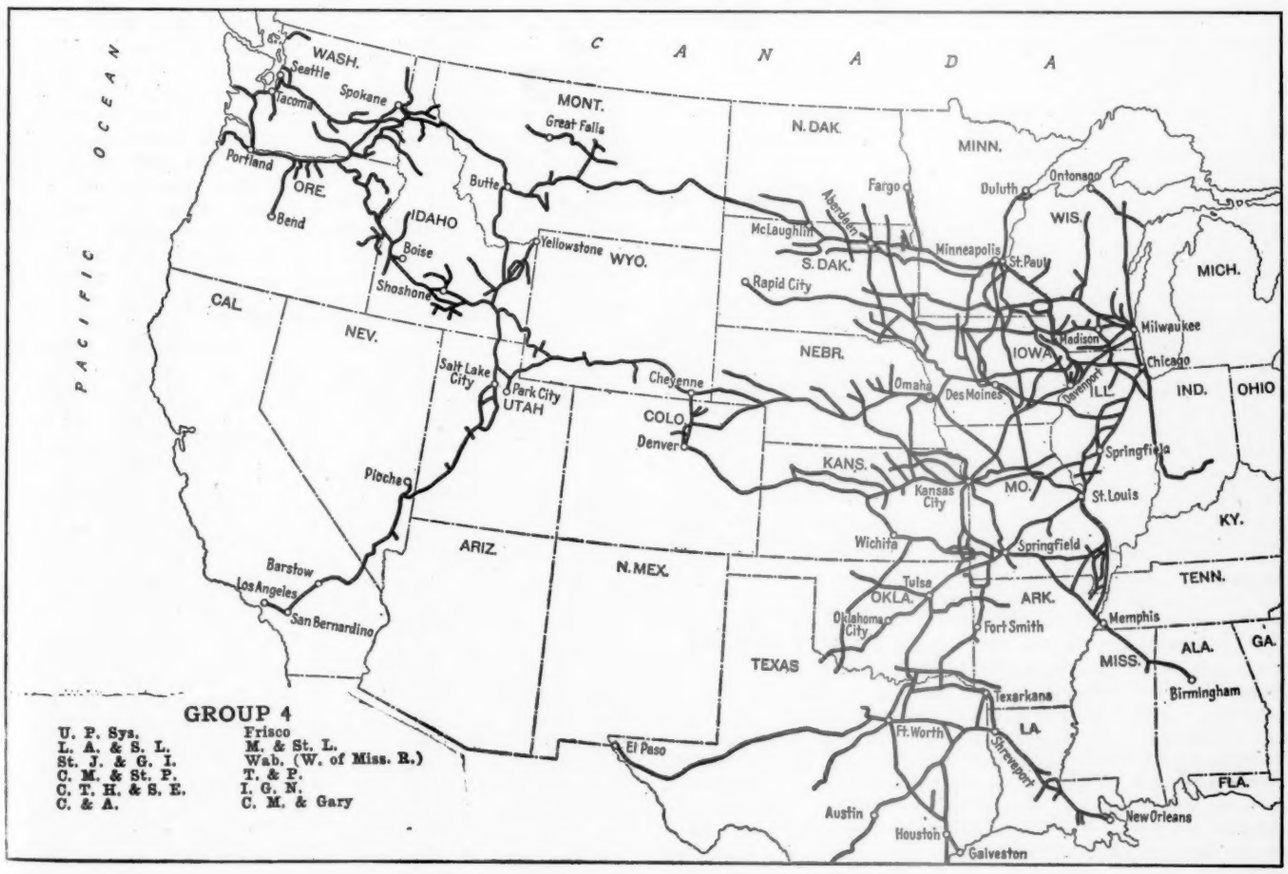

**GROUP 2**

| | | |
|---|---|---|
| A. T. & S. F. | Min. Range | D. S. S. & A. |
| C. & N. W. | D. M. & N. | S. S. W. |
| C. St. P. M. & O. | D. & I. R. | C. & E. I. |
| N. W. P. | Spok. Int. | N. O. T. & M. |
| Mid. Val. | D. W. & P. | W. P. |
| M. & N. A. | Cop. Range | D. & R. G. W. |
| L. & A. | L. S. & Ish. | D. & S. L. |
| Ft. S. & W. | Soo Line | |




**GROUP 3**

| | |
|---|---|
| S. P. (Inc. Cen. P.) | T. P. & W. |
| C. R. I. & P. Sys. | C. P. & St. L. |
| E. P. & S. W. | M. K. T. |
| K. C. M. & O. | M. O. & G. |
| Vik. Shr. & P. | D. & R. G. W. |
| S. A. & A. P. | D. & S. L. |
| Mo. P. | |




**GROUP 4**

| | |
|---|---|
| U. P. Sys. | Frisco |
| L. A. & S. L. | M. & St. L. |
| St. J. & G. I. | Wab. (W. of Miss. R.) |
| C. M. & St. P. | T. & P. |
| C. T. H. & S. E. | I. G. N. |
| C. & A. | C. M. & Gary |

systems present fairly average conditions while many others do not have that broad advantage.

## Each Group Should Present Average Conditions

Each western group should therefore present, as nearly as possible, average conditions. This may seem that each should have broadly the same diversity of traffic, well balanced by territorial distribution, climatic and crop conditions and comparable routes and channels of trade and commerce, also routes between large cities and producing and consuming centers of substantial equality that can furnish adequate competitive service to the public. Stated differently, if certain groups occupy only one part of the western territory, remembering the wide diversity in fundamental conditions throughout that territory, and are dependent upon one set only of crop and climatic conditions and the limitations in volume and types of traffic which those limited conditions present, those groups unless by accident cannot present average conditions of revenue and expense to the whole rate group. It may be assumed that these provisions of the law were enacted in the light of existing practical conditions. In western territory there were, at the time the law was under discussion and are today, several railroad systems presenting reasonably average conditions, but for the very reason that the law was enacted, an improvement in these conditions in various respects was deemed essential.

The Chicago, Milwaukee & St. Paul line was constructed through to the north coast for the purpose of competing with other strong systems already occupying that territory, anticipating, it may be assumed, that the continued growth of traffic would provide sufficient revenue for all lines in that territory. If the volume of traffic has been disappointing, the result illustrates the necessity for a wider distribution of supporting territory and a better average of conditions, such as is found in the case of the other systems referred to.

If average conditions underlie the policy of this law, both in the fixing of rates for group purposes and in the grouping of railroads so as to enable them to earn, as nearly as may be, the specified return, the grouping of the Chicago, Milwaukee & St. Paul with the Great Northern or Northern Pacific fails to meet the situation because that grouping confines those lines to a specified portion of Western territory and to similar conditions, economic, climatic and physical, and as compared with other existing systems and tentative groups, leaves doubt in my mind of the ability of that limited group to measure up to the average standard of earning power which the law contemplates. The solution would seem therefore to be to find other grouping for the St. Paul which will give broader support, wider distribution of mileage and greater opportunity for the average conditions presented by Western territory as a whole.

I hope I may escape the charge that I am undertaking to make a map of Western territory or even to argue the future of other western systems with which I obviously have no concern and for which I carry no responsibility. I hope, however, to be helpful in the making of these tentative suggestions and acknowledge that the reason they are made is because I am persuaded that it is unwise, impossible and unnecessary to break up the long standing and, as I believe, efficient close relationship between Burlington, Great Northern and Northern Pacific.

Responding to the inquiry of Mr. Commissioner Hall at the hearing on November 17 that if I have faith in the suggestion that the western mileage may be effectively grouped into four principal systems I should contribute a concrete suggestion for that purpose, I now offer in evidence a set of maps with accompanying statistical references showing mileage, investment in road and equipment, percentage of return and other essential features.

## Western Systems Should Be Based on Chicago and St. Louis

In the first place the Western mileage is already in a general sense largely grouped in a few large systems, loosely welded together but definitely related in physical, traffic and financial relations. There are, however, several important independent and smaller lines and lesser properties with which I am not now undertaking to deal. It appears to have been the view of the commission that further progress toward a lesser number of systems and a greater degree of association is expected in western territory. This is probably in keeping with the intent of the law. It is further in keeping with the underlying policy of the rate-making provisions as well, because the consolidation provision and the rate-making provisions seem to be complementary to each other. I have adopted the view of the commission that in carrying out these requirements Western systems should be based upon points like Chicago and St. Louis where immediate connection is made with eastern and southeastern railroads, and the whole basis of the suggestion which I shall make rests upon the assumption that this course is logical and necessary.

Present day conditions are the result of gradual growth, and the sensitive balance of interchange relations between connecting carriers in western territory cannot be disturbed without serious results, unless in the changes that are made a similar balance is restored. I mean by this that today we have certain through lines like Santa Fe, now based on Chicago and with connecting lines on St. Louis, and extending through western gateways like Kansas City to the southwest and far west. The close association of Southern Pacific and Rock Island presents a like situation, Rock Island having its own rails from Chicago and St. Louis through to connections with Southern Pacific at Texas points. Other lines not having such extensive mileage of their own have long-standing traffic interchange relations, such as Burlington at Kansas City with lines like St. Louis-San Francisco, Missouri, Kansas & Texas, Kansas City Southern and others. As a result of these varied conditions, through routes and channels of trade and commerce have long been in effect, competitive in character, and the maintenance of these heavy lines of supporting revenue tonnage movement by the maintenance of these great gateways of interchange traffic is absolutly vital and essential to the continued strength and growth of every line where such relations exist.

The tentative plan of the commission proposes to bring the southwestern lines through, by consolidation, to Chicago and St. Louis, leaving lines like Burlington obviously deprived of a large amount of competitive interchange at Kansas City and St. Louis. The same conditions have been pointed out at other gateways, such as Denver and Omaha. As a further illustration, the commission proposes in tentative system 19 to group Missouri Pacific, Kansas City Southern and other southwestern lines with Chicago & Eastern Illinois. Burlington interchanges a large volume of competitive traffic at Kansas City with Kansas City Southern for points north of Kansas City, such as Omaha, intermediate territory, and points beyond. Missouri Pacific operates an efficient line between Kansas City and Omaha, and if grouped with Kansas City Southern will have through rails from Kansas City Southern territory to points north of Kansas City, thereby threatening Burlington interchange at that point. These examples can be multiplied, but sufficient has been said to indicate the justice of the statement that the plan of the commission either goes too far or does not go far enough. In carrying southwestern lines through the great gateways of Kansas City and St. Louis, no adequate provision is left for the stub lines of Burlington and other carriers resting on those gateways.

## Proposed Groups Not Much Bigger Than Present Systems

Assuming, therefore, that the plan to base all western groups on Chicago and St. Louis is fundamental, it becomes necessary to point out at least a legitimate and logical way in which the commission's plan may go further so that these serious consequences may be escaped and corrected. Without including some of the smaller mileage which obviously in great systems would be only of a branch line character, western operated mileage may be stated as approximately 135,000 miles, and divided into four parts roughly would indicate systems of somewhat over 30,000 miles each. I offered in evidence at the hearing on November 17 a table of figures comparing one-fourth of western mileage and other financial operating and traffic statistics with similar figures on the existing New York Central and Pennsylvania systems. In that table one-fourth of the total miles of all tracks of western lines is shown aggregating 46,805 miles, but these include all trackage and short lines, etc., whereas the figures should be limited, in my opinion, to miles of line. However, geographical extent and line, or track mileage, does not seem to me to be the important test. There are today systems like the Santa Fe extending from Chicago to Galveston, San Diego and San Francisco with mileage approximately half-way beyond towards Portland. Southern Pacific owns and operates mileage

from Seattle to New Orleans and to Ogden. Union Pacific operates from Omaha to Seattle, San Francisco and Los Angeles. Burlington, Northern Pacific, Great Northern and Colorado & Southern with subsidiary companies have been associated for many years in the operation of approximately 28,000 miles of line. The commission in its plan proposes to group for purposes of consolidation the Union Pacific and Chicago & Northwestern, indicating a consolidated system from Duluth and Chicago to Los Angeles, San Francisco and Seattle. It would seem, therefore, to follow that in geographical extent alone, Western groups covering generally the entire western territory offer no real objection.

The more essential features in my judgment, however, are the volume of business, the quantity of equipment, the number of employees and like features, indicating the quantity of management required for effective administration and operation. Comparing one-fourth of western statistics in these particulars with existing conditions on New York Central and Pennsylvania systems, the exhibit before referred to shows that in substantially all features the problems of management are today greater in volume and extent in those two eastern systems than upon a tentative western system covering one-fourth of western railroad operation. It would seem that successful operation would only require a skillful scheme of organization, with proper sub-divisions directed by efficient and comprehensive local authority, and there is ample precedent in existing organizations for the moderate extension of that idea in the event these somewhat larger groups should be approved.

It seems necessarily to follow that these western systems should each have an outlet throughout the southwest, and to the Gulf of Mexico, including access to Mexico and access throughout western territory to the Pacific ocean. It is obvious that exact equality cannot be secured upon any possible plan, but that a reasonable approximation of like conditions is all that is available and all that the statute requires. With these views in mind, therefore, I have undertaken by these maps to tentatively suggest for consideration four main groups.

## General Characteristics

It will appear that each western group is provided with two through lines to the Pacific Coast. Unless the decision in the Central Pacific Control case be changed, the combined Southern Pacific-Rock Island group is practically afforded two through routes for transcontinental business. In suggesting the combination of the Union Pacific and the Chicago, Milwaukee & St. Paul, these conditions were also in mind, and the value to a group so constructed has already been pointed out through the shortening of distance between Chicago and many important points in the far northwest, and the relief that will be afforded to the present main line of the Union Pacific between Omaha and Portland by the other available route furnished by the Chicago, Milwaukee & St. Paul rails. In the tentative plan it is proposed to allocate the Denver & Rio Grande and Western Pacific to the Atchison, Topeka & Santa Fe, affording that system two separate and distinct routes between the middle west and the Pacific Coast.

The objection heretofore urged in the courts grounded on the Sherman Act, not only to the Union Pacific-Southern Pacific combination, but also to the Southern Pacific-Central Pacific combination, seems to have become capable of correction under the provisions of the Transportation Act and the authority of this commission to specify the conditions necessary to protect the public interest. This was done in the recent decision of the Central Pacific case, and the grouping of Denver & Rio Grande and Western Pacific with Santa Fe, presenting, as it appears to do, quite similar conditions, may be accepted as having been proposed as in keeping with public interest as well.

In the case of the Northern Pacific and Great Northern we have already shown that but 2 per cent of the total competitive tonnage handled by them both will not, if they are allowed to consolidate, be open to actual and effective competition by other lines. For this reason as well as in accordance with policy indicated as to Central Pacific and Santa Fe lines, no public interest will be adversely affected if the Northern Pacific and Great Northern are allowed to consolidate with the Burlington, nor can there be objection from the standpoint of public interest, for the reason stated, to the consolidation of the Union Pacific and Chicago, Milwaukee & St. Paul. The provision for each of these four western groups of alternate through routes connecting in the west will plainly be in the interest of better and more efficient handling of cars, shorter routing by the direct line and the wider distribution of traffic over the lines of each system.

## Group 1—Burlington

Group 1 is composed of Burlington, Great Northern, Northern Pacific, Spokane, Portland & Seattle, Colorado & Southern, Fort Worth & Denver City, Wichita Valley and Trinity & Brazos Valley, all at present associated lines through financial relations and long standing close traffic interchange relations. These lines aggregate 27,813 miles of operated mileage and 27,087 miles of owned mileage. To these have been added the Chicago Great Western, Green Bay & Western, Kansas City Southern, Louisiana Railway & Navigation Company and also the Colorado & Wyoming, a small separately owned property. By these additions the operated mileage has been increased 3,132 miles and the owned mileage 2,990 miles, a moderate addition only to the present system mileage.

By the inclusion of Chicago Great Western, one of the smaller independent properties may become a part of considerable value to this system by affording alternate routes between Chicago and the Twin Cities and between Omaha, Kansas City and the Twin Cities, and through the addition of the Green Bay & Western a through route for the movement of grain and other products which may move by the lakes or trans-lake ferry to and from eastern lines. This combined system would have access to the Great Lakes-St. Lawrence waterway when developed, at Chicago, upper Lake Michigan points and at Duluth and Superior. It will have contact with the Canadian lines at various points for international business and adequate access to the Pacific ocean throughout the northwest. By extending the system to the Gulf of Mexico through the Kansas City Southern and Louisiana Railway & Navigation Company, one of the present day routes and channels of trade and commerce is preserved and the system, in lieu of interchange at Kansas City, is provided with its own rails to Gulf ports. The retention of the Colorado & Southern lines in this group preserves not only the ownership, but also the north and south route which has been developed between Colorado & Southern, Burlington, Northern Pacific and Great Northern, or, in other words, between the northwest, throughout the Rocky mountain territory and the southwest. Without doubt, as a part of future development these two southern portions of the system would be brought together by additional mileage so as to give direct access between Kansas City and points in Oklahoma and Texas, as well as between points in Louisiana and Texas.

## Group 2—Santa Fe

Group 2 proposes the association of Santa Fe, Chicago & Northwestern system lines, the Iron Range roads, the Soo Line, the Chicago & Eastern Illinois, St. Louis-Southwestern, certain other smaller properties and one-half interest in the Denver & Rio Grande, Denver & Salt Lake, and Western Pacific. The association of Santa Fe with Chicago & Northwestern and Chicago & Eastern Illinois seems to represent a rational instance of what may logically and properly be done, particularly where effort, as indicated in the language of the commission's report of August 3, 1921, is made to minimize dismemberment of existing lines or systems. By Chicago & Eastern Illinois, southern Illinois coal may move over one-line haul to the market territory afforded by Chicago & Northwestern, and Chicago & Northwestern secures not only a line into St. Louis, but also an outlet at the Ohio river into the southeast.

Santa Fe connects with Chicago & Northwestern near Peoria and at Chicago; it also connects at Superior, Nebraska, thus offering a route, which is today to some extent in use, for movement of Kansas grain to Omaha and the Twin Cities, as well as interchange of traffic between the territory served now by the two systems, not unlike the present Sioux City line owned by the Burlington and the Great Northern. In the event of further study of these plans some variation in detail may be suggested. For instance, the line of the Chicago Great Western between Kansas City and Des Moines might well be included in this group, thereby giving direct connection between the Missouri River at Kansas City and St. Joseph and territory of the Chicago & Northwestern, Des Moines and north, and if connection were considered necessary between Omaha and Kansas City, doubtless arrangements accomplishing that could be made. The plan of the Santa Fe, as testified to before the commission by its president, to secure authority to extend its line to St. Louis immediately suggests the value of the connection there with the Chicago & Eastern Illinois, as well as

the St. Louis Southwestern, and the St. Louis Southwestern leading from St. Louis into the southwest would appear to be a logical addition to the present extensive Santa Fe mileage in that territory and to provide a shorter distance for the movement of traffic destined to St. Louis and eastern connections and an alternate route for business to Chicago and beyond, which would without doubt relieve pressure at times of heavy business upon other lines of the proposed group. Santa Fe rails today reach Pueblo and Denver, there being now double-track operation with Denver & Rio Grande and Colorado & Southern between Denver and Pueblo. In order to provide Santa Fe with an alternate route throughout the central west to San Francisco, it is proposed as a fair matter for consideration and in order to give strength to Denver & Rio Grande and Western Pacific, that it have not the entire ownership, but an equal one-half ownership in those two lines and also in the Denver & Salt Lake.

### Group 3—Southern Pacific

As before indicated, the proposed Southern Pacific-Rock Island group as planned by the commission contemplates not only transcontinental mileage today in effect via El Paso gateway, but indicates mileage to Denver and Colorado from the east and via Central Pacific from San Francisco to Ogden and Salt Lake City. The addition of the Missouri Pacific and Missouri, Kansas & Texas systems is suggested, together with certain other lines, including the El Paso & Southwestern. By connection south from St. Louis a shorter and more direct route into the southwest—at least an alternate route of an efficient character—is developed. The same is true of the more direct mileage south from Kansas City occupying a different belt of territory than that now served by the Rock Island lines leading southwesterly from Kansas City. The two lines from Missouri river to Colorado points occupy distinct portions of Kansas and Colorado, but both ending at Colorado need consideration for business beyond. To bridge the gap between Colorado and Utah and again to contribute strength to the Denver & Rio Grande for its future development and improvement and including the Denver and Salt Lake, one-half ownership of the Denver & Rio Grande and Denver & Salt Lake is suggested for this Southern Pacific-Rock Island group.

By this suggestion of joint ownership of the Denver & Rio Grande and Denver & Salt Lake between the Santa Fe-Northwestern group and the Southern Pacific-Rock Island group, the one remaining transcontinental route which apparently requires improvement and development, and particularly shortening, would seem to be provided with the means for that purpose and the traffic needed to support it. It is interesting to note that throughout the northwest all of the routes now in operation are reasonably matured and in effective and economical operation. The same is true of the Union Pacific-Central Pacific route and equally true of the Santa Fe and Southern Pacific routes throughout the southwest. Many perplexing problems would be solved by providing for the Denver & Rio Grande and Moffat line in the manner stated not only the additional traffic but also the financial strength needed to accomplish the improvements necessary.

### Group 4—Union Pacific

The grouping of the Union Pacific and Chicago, Milwaukee & St. Paul has already been suggested, and whether the present suggestions for four groups are entertained or not, that suggestion has merit and is entitled to consideration. Broadening the proposal, however, to include a discussion of the four-group plan, it is proposed that Union Pacific system lines and Chicago, Milwaukee & St. Paul system lines be grouped with Chicago & Alton, Minneapolis & St. Louis, St. Louis-San Francisco, Wabash lines west of Mississippi river, Texas & Pacific and International & Great Northern. The decision of the commission in the Central Pacific case assures the Union Pacific of a continued close traffic relationship with that line and thereby the continuance of its present effective through route between the Missouri river and San Francisco. By the addition of the Chicago & Alton and the Wabash lines west of the Mississippi river, direct connection between Kansas City and St. Louis and between Omaha and St. Louis, and between Kansas City, St. Louis and Des Moines and territory beyond, is secured. In addition the important Chicago & Alton line between Chicago and St. Louis is added. With the St. Louis-San Francisco, one of the stronger southwestern systems provides mileage from St. Louis and Kansas City into the southwest, and the addition of the Texas & Pacific provides access to New Orleans, and the International & Great Northern to Houston and Galveston. The Texas & Pacific includes the present line to El Paso with access to Mexico as the traffic with that country may in the future develop.

I have proposed these tentative western groups with hesitation and only as an indication that I believe that the tentative plan of the commission goes either too far or does not go far enough. I believe that the intent of the statute taken in connection with the present extensive systems now in the west justifies, if it does not require, that the western groups shall be based on Chicago and St. Louis. If this be true, I have been forced to the conclusion that there is no logical nor fair way to group the western mileage short of groups somewhat as I have indicated.

### Influence of Panama Canal

The influence of the Panama canal is today the most outstanding and significant influence on western traffic. Enough has developed to indicate the continued influence of that new route and no one will today undertake to predict, as this western country grows, the ultimate influence of low water rates between Atlantic, Gulf and Pacific ports. There are today systems in the west having their own rails from connections with eastern lines to the Gulf and to the Pacific Coast and intermediate territory. It is not proposed to disturb or disrupt those systems. It must follow, then, as a matter of common justice that other groups must have reasonably equal opportunity to compete and to grow, and therefore unless the plan to base western groups on Chicago and St. Louis be abandoned, equal competitive opportunity demands that each group have through rails into the west and southwest.

It is obvious that groups of the character suggested will necessarily involve considerable study as to the many details which are presented, but which I have not in this general survey undertaken to deal with. It would seem necessary, before considering details of lesser importance, to consider the general plan in its broader aspects, leaving the working out of details, readjustments and modifications, to follow the approval of a general basis.

I think I have shown that groups of the size suggested are not substantially larger in geographical extent nor in volume of business nor other features taxing management than features of the tentative plan and precedents in present day operation justify. The history of American railroads has been one of steady development into larger operations and larger systems, although for a time delayed and impeded by the policy of the Sherman Act, which now is in a measure behind us under the policy announced in the Transportation Act, and as recently interpreted in the Central Pacific decision. I do not believe that the full benefits which the public expects to secure through these consolidation provisions will arrive unless a courageous and comprehensive view is adopted. Finally, I predict that the courage and ability of American railroad management, if permitted to do so, will demonstrate the value of great western systems similar in type to those I have suggested, and I offer these suggestions in the belief that they are sound in principle and with the hope that they may be of assistance to the commission in the solution of the difficult problem that confronts it.

In addition to the four-system plan, Mr. Holden also discussed, with maps and statistical exhibits, several other possible groupings of various lines, to show that the necessity of radical disturbance in the present status of the Great Northern which the tentative plan of the commission involves may be avoided. Among these were the Union Pacific and Chicago, Milwaukee & St. Paul; C. M. & St. P., and Illinois Central; Chicago & North Western, Illinois Central and Missouri Pacific; C. & N. W., I. C. and Soo Line.

## Presidents of G. N. and N. P. Urge Consolidation With Burlington

Ralph Budd, president of the Great Northern, and Charles Donnelly, president of the Northern Pacific, summed up the testimony on behalf of the Northern lines in support of their request for authority to effect an actual consolidation which is feasible, whereas, they stated, the grouping proposed by the commission's tentative plan could not be accomplished

with the consent of the roads. Mr. Budd also pointed out the economies which would result from such a consolidation, which he estimated at least $10,000,000 a year to start with.

Mr. Budd's statement was in part as follows:

I wish to emphasize particularly that the proposed consolidation would distinctly promote the public service. Service will be improved by eliminating terminal delays at transfer points and by getting a better distribution of cars throughout the year, thus making available a larger number of cars for the seasonal movement of crops which mature at wide separated dates in the enlarged territory; by consolidated offices and tariffs; by improving local passenger service which will be possible by the elimination of duplicate fast through service permitting some of the through trains to give local service; by avoiding switching and the charges incident thereto at points common to two or more of the three lines; and by automatically making every industry now on any one of the three lines at points common to two or more of them an industry on the consolidated system.

The association of these three lines for the last 21½ years has resulted in improvement of service and convenience to the public more or less in the manner and of the character described. The divorcing of either one or both of the Northern lines from the Burlington would result in loss to the public of many of the advantages which have resulted from the association, so that, while further improvement will result from consolidating these three lines, separating them would cause a loss of a part of what has already been accomplished.

One of the striking advantages of the combination of the Great Northern and the Northern Pacific with the Burlington is the fact that it would tend to insure the consolidated system against vicissitudes, such as business depressions and crop failures, that may occur locally and which would be much more serious in the case of a line confined to a narrow territory. The dangers in this respect are especially great in the northern tier of states west of Lake Superior, where the dependence is very largely upon a single crop, that is, spring wheat. An important feature of the supplementary character of the Burlington to the two Northern lines is the way in which it affords this stability, and this is also the better accomplished when the Colorado & Southern and the Fort Worth & Denver and Spokane, Portland & Seattle are included, as the system so made up comprises a territory of such varied resources and such diverse interests and crops that it becomes fairly representative of the western United States.

## Operating Economies

The operating economies that will result from the consolidation are certain to be very great. The facts that there are many points of contact between the three roads; that while occupying different territories there are alternate lines between several points; and that the wide geographical spread of territory conduces to better average use of equipment, all lend themselves to a plan for saving in operating expenses and at the same time accomplishing more service with the existing railroad facilities.

The Great Northern, Northern Pacific and Burlington have avoided the building of duplicate lines and terminals by making joint use of lines and terminals. To that extent savings by joint use and by avoiding unnecessary construction of separate lines have already been made. Also each of the Northern lines uses jointly with the Burlington and with the Spokane, Portland & Seattle, certain facilities and each does some switching for the other, and for the Burlington and Spokane, Portland & Seattle. There is now practically no duplication of terminals as between the Burlington and the Northern lines at their points of contact; namely, Twin Cities, Sioux City and Billings. To a large extent, therefore, savings by joint use of tracks and terminals and by the avoidance of unnecessary capital expenditures have already been made, but in some instances where the two Northern lines are now operating duplicate train service on tracks jointly used, further economies can be made by elimination of this duplicate train mileage; for example, by the elimination of the duplicate way freight service between Seattle and Portland.

The similarity of the requirements make it entirely feasible to standardize equipment on the proposed system. For example, box cars on each of the three roads at present must be built and maintained to meet the requirements of bulk grain shipments. These are requirements which other railroads in some other parts of the United States do not have to meet, and for that reason the type of box car most suitable for them in their territory is not the type that would be used in the northwest.

The pointing out of savings and other advantages in handling equipment on the proposed system does not, by any means, lead to advocating a single car pool for the whole United States. Consolidating the railroads into a limited number of systems would result in all of the equipment belonging to the same limited number of owners. It would also make for more advantageous use of all the equipment within each of the enlarged systems because one management would be substituted for several; and yet there would be retained the advantage of having the equipment owned by the railroad on which it would, for the most part, be used. It might fairly be said that the benefits in the handling of equipment which will come from consolidation would realize all the practical advantages of a limited number of car pools, and at the same time would preserve the highly important advantage of having the cars provided, maintained, and controlled by the owner, and this would be much better than a single car pool to be owned and managed independently of any railroad system.

While many articles are purchased in quantities sufficiently large to obtain the best price so far as price is affected by quantity, there are some things like rolled steel wheels, signal wire, electrical supplies, incandescent lamps, steel castings, creosote and zinc chloride for tie treatment, that could be advantageously purchased in larger quantities than is possible by each of the three roads separately. There would be an advantage in buying in carload lots such material as bolts, nuts, washers, nails, screws, lag screws, and other items which, by combined purchase, would enable handling in carload lots and unbroken packages.

Illustrative of reductions in general expenses are the following: Elimination of interline reports and divisions, elimination of joint facility bills, and elimination of per diem reports. Absorption into one organization of the three organizations and the various subsidiaries would avoid considerable duplication on account of the several separate staffs now employed. Likewise in the traffic department there would be a saving by combining the present independent forces both on the line and at outside agencies making one instead of separate offices for traffic solicitation, etc.

While the immediate savings would be very large, they would increase as their full effect were realized, especially the economies from such things as standardization of equipment and other materials and supplies which would increase rapidly after a period of years. The annual savings are estimated at not less than $10,000,000 from the beginning.

To serve a new and growing territory where branch lines must of necessity be built and operated without profit for a considerable period, the strength shown by this system is none too great. Therefore, by all the tests of preserving existing routes and channels of trade, preserving competition, saving in operating costs, improvement of service, and similarity of the traffic and financial characteristics to the average of the territory in which it is situated, the consolidation of the Great Northern, Northern Pacific and Burlington roads into one system seems to be justified.

Speaking for the Great Northern Railway Company, I feel it is my duty to point out that the consolidation statute is purely permissive and, therefore, proceeds upon the theory that railroad companies will not consolidate unless they find it to their ultimate interest to do so. This being true, I am satisfied that the Great Northern could not find it to its interest to promote any consolidation which would involve the loss of its interest in the Burlington and of the highly important relationships which have been built up with the Burlington during the past 21½ years. I have no doubt the Northern Pacific would have exactly the same attitude toward any proposal that it separate itself from the Burlington. Therefore, the practical result is that if either one of the Northern lines should be put in a separate group from the Burlington, there would be no motive on the part of such Northern line to take the necessary action to effectuate the consolidation plan.

On the other hand, it is clearly to the interest of both of the Northern companies, as well as of the Burlington, to be put in the same system, and if the commission in the exercise of its responsibilities in this matter should put the three properties in the same group, as we advocate, the consequences would be to bring about a speedy consolidation with all its resulting benefits to the public, and this would naturally give a most valuable and

much needed impetus to the realization of the salutary purposes of the consolidation principle which Congress has advocated.

## President Donnelly's Testimony

Mr. Donnelly said that the course which this whole proceeding has taken and the amount of testimony submitted in support of and in opposition to propositions which may fairly be described as merely contingent, may have left upon the mind of the commission an erroneous impression as to the real views and desires of the representatives of the Northern lines, and that he did not wish to allow the hearing to close without correcting this impression, if it exists. "The Great Northern and Northern Pacific companies are in earnest certainly in the desire of each of them to retain its interest in the Burlington," he said, "and therefore in their opposition to any plan of which the consummation would involve the separation of either from the Burlington. It is undeniable also that if a separation must be made each would prefer to retain its own interest in that property and to acquire the interest of the other; but it would be only as a most unwelcome alternative that such a result could be considered.

"The complementary character of the three properties and the manner in which the east end development of the Great Northern balances the west end development of the Northern Pacific have had an important influence in the prosperity of each of the three companies; and a separation of either of them from the other two would be quite certain to affect prejudicially not alone the company separated, but as well the two remaining companies which were allowed to combine." He continued:

This, of course, expresses merely the selfish interests of the owners of the three properties. It is adverted to here not as being in itself an argument in support of their consolidation, but as tending to repel any suggestion that their consolidation is not the chief object of each of the Northern lines, or that either of them would be satisfied with a plan which called for the elimination of one of them from a group of which the Burlington formed a part. We believe, moreover, that the interest of the public in a continuance and in a closening by consolidation of the relations between these three companies is hardly less than that of the owners themselves. The evidence submitted by Mr. Budd has shown the great economies that could be made by the operation of the combined properties under a single control. The Northern Pacific officials took part in the studies resulting in the conclusion that such economies could be effected, and they concur entirely in what Mr. Budd has said on this subject.

The full measure of the possible improvements cannot well be realized by anything short of a combination, under a single ownership and control, of the equipment of the three companies. The Burlington owns approximately 70,000 freight cars, the Great Northern 56,000, and the Northern Pacific 52,000. These may be regarded as reservoirs of freight equipment, to be drawn upon according to the needs of this or that particular territory served by the companies owning them. The maximum drain in the territory served by the Burlington is made at a time different from that when the demand made upon the other properties is at its height; and to get out of the equipment of the three companies all of the service of which it is capable, it ought all to be subject to the control and direction of a single authority.

Other advantages would be that, with the lines of the three companies under a single control, the points of contact, or junction points with other lines would of course be multiplied, thus facilitating the return of equipment going onto foreign lines. The unification of terminals and the elimination of interchange switching at points like Duluth, Minneapolis, Spokane and Seattle would expedite the handling of business and reduce operating costs; and the consolidation of less-than-carload shipments, now moving to common points in only partially loaded cars via the Great Northern and Northern Pacific, would reduce the number of cars employed in this service, and make available for other service any of the cars now used in it.

Considerations of the welfare both of the public and of the owners therefore call for the consolidation of these three properties; and it can scarcely be doubted that the commission would feel constrained to yield to these considerations, and to authorize the consolidation if it were not for the difficulties to which the situation of the Milwaukee gives rise. These difficulties, however, do not appear to be insurmountable. The grouping of the Milwaukee with the Union Pacific would accomplish at once two of the main conditions which the Transportation Act imposes; it would produce a system which, as regards both geographical location and financial strength, and return upon investment, would fairly match the Burlington-Great Northern-Northern Pacific combination; and it would result in the elimination of less competition than would be eliminated by the consolidation of the Milwaukee with either of the other two Northern lines.

## Commission Should Approve a Practical Consolidation Plan

It should be the aim of the commission, in determining upon its final plan, to do so with a view to avoiding those practical difficulties which would prevent its consummation. The attitude of the state authorities and of the shipping public towards the various plans under consideration will, of course, be developed more fully in the course of the hearings which are to take place at local points in the territory affected, and it is perhaps too soon to speak now of what their attitude will be. Indeed, it is by no means certain that their attitude will be fully disclosed in the course of those hearings, for the subject is one in which the public has as yet taken but a languid interest. But it is safe to say that no combination can ever be put through in the face of an aroused and energetic public opposition to it, and it is equally safe to say that no combinations would be more energetically resisted in the territory affected than the combination of the Great Northern and Milwaukee on the one hand, and of the Northern Pacific and Milwaukee on the other.

Moreover, it is not alone practical difficulties in the way of public opposition to which consideration should be given by the commission. In the present state of the law, at least, the difficulty in the way of obtaining from the stockholding interests concerned the consent necessary to effect such consolidations must be taken into account. Neither the Northern Pacific nor the Great Northern does conceive it to be to its advantage to consolidate with the Milwaukee; nor would either of those companies relinquish voluntarily its interests in the Burlington. The practical difficulties, therefore, in the way of a consolidation of the Burlington with either of the Northern lines alone, may be said to be insurmountable, as are also the practical difficulties in the way of winning the assent of either of the Northern lines to a combination with the Milwaukee. On the other hand, it is conceived to be so clearly in the interest of both of the Northern lines to consolidate jointly with the Burlington, that the directorates of all three of the companies have taken formal action approving such a consolidation, and unquestionably will recommend it to the stockholders.

Previously E. T. Dakin, assistant controller, and H. E. Stevens, chief engineer, of the Northern Pacific, and V. P. Turnburke, statistician, and G. R. Martin, vice-president, of the Great Northern, had given detailed testimony in connection with the dispute between the two roads as to the advantages which the Great Northern had pointed out to result from a combination of the Northern Pacific and the St. Paul as against a combination of the Great Northern with the St. Paul.

S. W. Smith, representing the American Mining Congress, presented a protest on behalf of the Arizona chapter of that organization against proposed system No. 17—Southern Pacific, El Paso & Southwestern and Rock Island, on the ground that it would eliminate competition among the carriers to the disadvantage of the ore producers and shippers of the southwest, who felt that their present rates were the result of competition.

The hearing on the western system proposed in the commission's tentative plan was concluded on March 2, so far as the principal testimony is concerned, and an adjournment was taken until some time after March 15. Hearings are also to be held in the west, however, at which some of the roads that did not make their presentation in Washington may be heard, as well as representatives of local interests.

Further hearings as to the western systems will be held before Commissioner Hall and Examiners Healy and Hoy, according to an announcement issued on Tuesday, at the following places:

March 19, United States Court Room, St. Paul, Minn.
March 23, United States Court Room, Helena, Mont.

March 26, United States Court Room, Seattle, Wash.
March 28, Rooms of Public Service Commission of Oregon, Court House, Portland, Oregon.
March 31, 237 Merchants Exchange, San Francisco, Calif.
April 7, United States Court Room, Los Angeles, Calif.
April 11, United States Court Room, Salt Lake City, Utah.
April 16, United States Court Room, Denver, Colo.
April 23, United States Court Room, Fort Worth, Texas.
April 26, Coates House, Kansas City, Mo.
April 30, Hotel Jefferson, St. Louis, Mo.

Beginning on May 16 at Washington, hearing will be held with respect to respondents which, under the tentative plan, should be considered in connection with systems Nos. 1 to 9 inclusive, in the eastern territory, or in connection with such alternative systems as may be proposed.

# How Automatic Train Control Affects Operation*

## Four Systems to Meet the Government Specifications Will Affect Track Capacity Differently

By F. L. Dodgson
Consulting Engineer, General Railway Signal Company, Rochester, N. Y.

AT THE PRESENT TIME 49 railroads of the United States find themselves obliged to select and install some kind of an automatic train control device on at least one full passenger locomotive division. On on before January 1, 1925, every locomotive operating over the division must be controlled by that automatic device. Whether or not such additional safety devices are necessary, or whether or not the devices available for the purpose are sufficiently developed for practical use, are questions which are not now important, and need not be discussed at this time, for they have already been decided in the affirmative by our law makers. The question which is important at this moment is, what kind of a device will fulfill the roads' obligations to the commission?

Naturally, to answer this question we must refer to the order itself, for in the order are set forth certain specifications and requirements which must be met. It has been said that these specifications are very vague and misleading, and that they are capable of many different interpretations. To my mind these specifications when read as a whole and with a clear understanding of what is wanted, describe concisely and clearly certain systems which will, in the opinion of the commission, provide the necessary degree of safety in railroad operation. The primary object is safety, and the commission says that this can be accomplished by enforcing obedience to fixed signals. It does not, however, and perhaps very wisely too, say this is the only way in which the requisite amount of safety can be provided, thus leaving the way open for the development of some other kind of a signal system. We will, however, consider only those systems which are to be used with and may be considered as adjuncts to the present system of fixed signals.

### Two Systems from Which to Select

Broadly speaking, the commission has given a choice of two distinct systems, and it has defined them as:

1. Automatic train stop; and
2. Automatic speed control.

The difference between these is that in the first the train is to be stopped before it reaches the point of danger; and in the second the speed of the train is to be reduced to some prescribed rate before it passes the point of danger. In considering systems which are to be adjuncts to fixed signals, the point of danger is a signal in the "stop" position.

The specifications do not say how far from the signals the train shall be stopped, or at what speed it shall be running when it passes the stop signal; but they do say very distinctly that the devices "shall be operative at braking distance from the stop signal location if signals are not overlapped, or at the stop signal location if an adequate overlap is provided." This is certainly definite and concise and leaves no doubt as to the point at which the device shall begin its operation. In other words, it gives us what may be termed a starting point for our systems.

Some simple diagrams have been prepared which will aid in arriving at a clear understanding of the different systems. The first of these diagrams represents the automatic train stop system. In this diagram, Fig. 1, and in the others, the heavy black lines denote the speed restriction which is to be enforced; the amount of speed is represented by the vertical distance above the horizontal line. The horizontal line may be taken to represent the track. The dotted lines in the diagrams represent the speed of the train as it proceeds along the line. We will assume that when this dotted line crosses the speed restriction line, the device is brought into action, and the speed of the train is affected in the manner prescribed by that particular device.

### What the Automatic Train Stop Does

The automatic train stop is defined in the specification by these words:

"Without manual control by the engineman requiring the train to be stopped, after which the apparatus may be restored to normal conditions manually and the train permitted to proceed."

The action of the devices in this case must be to apply the brakes without any manual control from the engineman and he must be powerless to prevent such an application. Furthermore, the device must be so organized that the engineman can not release the brakes until the train has come to a stop. In this case there is no speed limit. The device must function at all speeds. This makes the speed restriction line a vertical one extending from maximum speed to zero speed. In the diagram it must be located braking distance from the signal if there is not an adequate overlap, or at the signal if there is an overlap.

It can now be seen what happens to a train operating under this system when it is approaching a stop signal. If the train is running at maximum speed, say 60 m.p.h., when it passes the point *a*, or in effect crosses the speed restriction line, its speed is at once reduced and it will come to a stop at the signal. After coming to a stop it may proceed without any speed restriction other than that which may be imposed by its own power. Again, should the train be running at a lower speed, say 10 m.p.h., the brakes will be applied and it will be stopped in a much shorter distance; and after being stopped it may proceed as before and pass

*From a paper read before the Central Railway Club, Buffalo, N. Y., on March 8.

the stop signal at any speed which its power will permit it to attain. In other words, with this system when the signal in advance is at stop, the brakes must be applied when the train passes the point *a* no matter what its speed may be. The brakes can then only be released by the engineman or fireman getting to the ground, after which all control ceases until another point similar to point *a* is encountered. So much at present for the automatic train stop system, or the "plain" automatic stop as it is sometimes called.

### Three Systems of Speed Control Provided For

Under the class designated as automatic speed control, the commission gives the choice of at least three systems. In the specification, under the heading "functions" it uses these words:

"The following features *may* be included separately or in combination, in automatic train stop or train control systems."

The feature which applies to the automatic train stop has already been quoted and in that case there was only one, but under automatic speed control there are four features. As they may be used separately or in combination, we would expect to be able to build up 4 systems when they are used separately and when each feature is used in combination with the others, we would be able to build up 10 systems. This, however, is not exactly the case. We will first consider the systems when these features are used separately.

The first feature relating to speed control is described as follows:

(a) "Automatic stop, after which a train may proceed under low speed restrictions until the apparatus is automatically restored to normal or clear conditions by reason of the removal of the condition which caused the stop operation."

As a matter of fact, this system differs from the system represented by Fig. 1, or the automatic train stop system only in that after the train has been stopped, its speed is to be restricted until normal conditions again exist, that is, until the train is again running under proceed signals. To construct a diagram to represent this system, it is only necessary to add to Fig. 1 a line to represent the speed limit after the train has been stopped. This is the heavy horizontal line shown in Fig. 2 as 10 miles or some such matter above the base line.

Again, as in the system represented by Fig. 1, the brakes must always be applied when the train passes the point *a* if the signal in advance is at stop, irrespective of the speed of the train at this time. Further, as in the system represented by Fig. 1, the train must come to a stop before it can proceed; but in this case, if it then exceeds a certain speed, the brakes will again be applied and the train brought to a stop. It can again proceed but it will again be stopped if it exceeds the prescribed speed. This condition must continue until the train is again running under clear signals. Feature *b* reads as follows:

(b) "Low speed restriction, automatic brake application under control of the engineman who may, if alert, forestall application at a stop indication point or when entering a danger zone and proceed under the prescribed speed limit, until the apparatus is automatically restored to normal or clear condition by reason of the removal of the condition which caused the low speed restriction."

This means that if the engineman, by the proper control of his train brings it to the prescribed speed before reaching the point *a*, no automatic brake application will take place. In other words, in the diagram which would represent this system (Fig. 3), the vertical speed restriction line would not extend below the prescribed low speed limit. Trains operating under this system could, therefore, pass the point *a* without automatic brake application, if the speed at the time they passed the point was below that prescribed. If, however, the train is not below the prescribed speed when passing the point *a*, the automatic device will act just the same as it acts in the other systems which we have described, and the train must come to a stop, after which it may proceed under the same conditions as represented by Fig. 2.

It would be permissible to allow the brakes to be released automatically when the speed is below the prescribed rate, and thus theoretically allow the train to proceed at the prescribed rate without stopping.

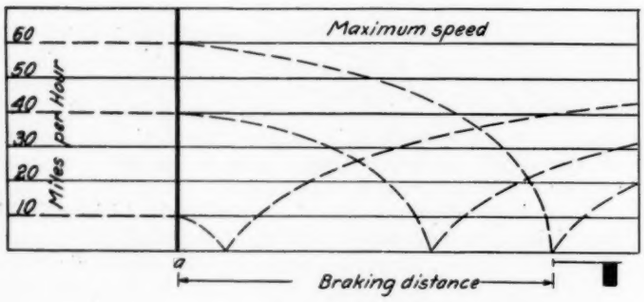


Fig. 1. Automatic Train-stop

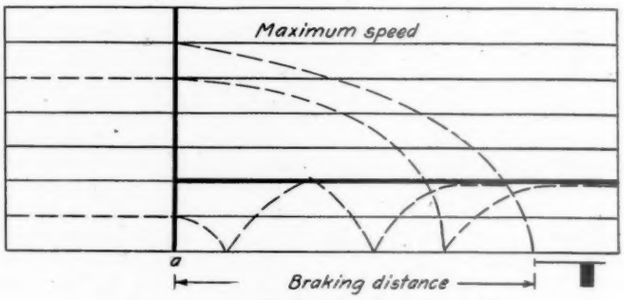


Fig. 2. Speed Control (a)

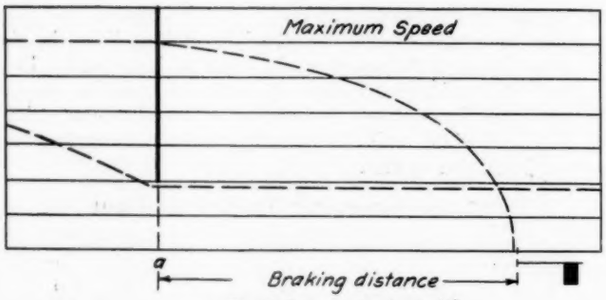


Fig. 3. Speed Control (b)

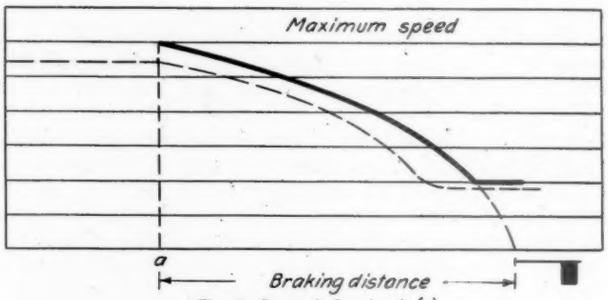


Fig. 4. Speed Control (c)

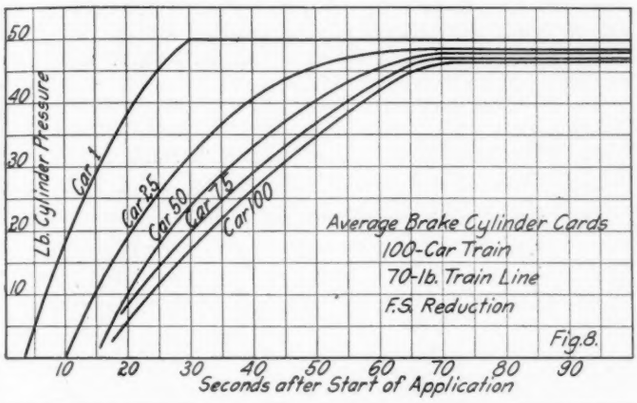
**Diagrams to Illustrate Effect of Different Devices on the Braking of Trains**

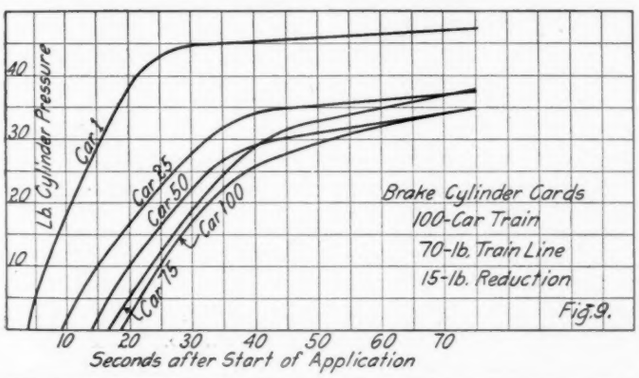
### Medium Speed Restriction an Important Feature

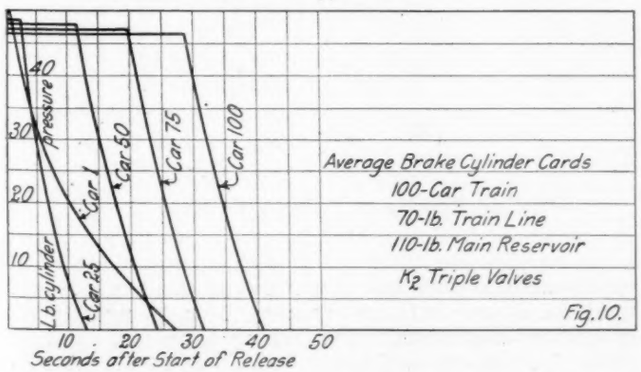
Feature *c* is quite different from features *a* and *b*, and is perhaps the most important one of the four. It reads as follows:

(c) "Medium speed restriction, requiring the speed of a train to be below a prescribed rate when passing a caution signal or when approaching a stop signal or a danger zone in order to forestall an automatic brake application."

Put in plain words this means, that if an engineman controls his train as he approaches a stop signal so that by the proper use of his brakes he is at all times able to stop his train at the signal, or to pass it at a prescribed low speed, then, and only then, will an automatic brake application be avoided. In other words, the engineman is compelled to obey the signal indications which, as the specifications say, is the "primary function of automatic train stop or train control devices."




**Effect of Train Line Reduction on Cars in Long Freight**

Fig. 4 is a diagram which represents the system which would be built up under feature *c*. The speed restriction line in this case is quite different from the others. If the train is below maximum speed at the point *a*, the device will not act; and if at any other point between *a* and the signal, it is at a speed below that which the brakes if automatically applied would bring it to a stop at the signal, the device will again not act. Technically speaking, this speed restriction line is the braking distance curve for the particular train which is being considered and the particular locality. The operation of trains under this system is so obvious that it need not be referred to further.

The fourth feature to which the commission has referred is not, I believe, intended to be used separately, but always in combination with one or more of the others. It reads as follows:

(d) "Maximum speed restrictions providing for an automatic brake application if the prescribed maximum speed limit is exceeded at any point."

This really provides a means for enforcing a maximum speed limit at all points along the line, and it is quite obvious that if this limit were placed low enough, a system would result which, as far as safety is concerned, would equal that of any of the others. It would, however, place such a restriction on operation that its use would be out of the question. It may be quite useful, however, when used in combination with one or more of the others, and in that connection it will be referred to later.

### Important Points to Consider

Such are the fundamentals of the system which the commission has outlined as being capable of meeting its requirements as to safety, and the carriers are allowed to take their choice in fulfilling their obligations under the order. In making this choice, however, there are a great many important things to be considered. First, is the system one in which the train control device is purely an adjunct to the fixed signals, or in other words are the signals necessary for the proper control of trains. Signals add immeasurably to the safety of railroad operation, and if the train control system which is to act in conjunction with them is so organized that it tends in any way to decrease the safety provided by the signals, then most assuredly a backward step is being taken in adding the train control.

To realize the comparative reliability of the modern automatic block signal there are those in service today where the stop failures are less than one in 60,000 operations, and the false clear failures are something like one in 4,000,000 operations. This illustrates the high degree of efficiency to which these devices have been developed. This development has taken a great many years; and while train control devices will no doubt ultimately be developed to the same degree of efficiency, it will take some years at least; so that if during the development period the enginemen rely on the train control devices to keep themselves out of trouble, the net result can not help but be a decrease in safety. It is most important, therefore, that when the train control device is in operation the engineman must still rely upon the signals in order to control his train properly.

The next important point to be considered is what kind of a brake application is to be made by the automatic devices. Until recently inventors have thought that all that was necessary in order to make an automatic brake application was to find some way to vent air from the train pipe. This is true, particularly if enough air is vented, but it is hardly a practical way to make a brake application. On passenger trains and on short freight trains a full service application will rarely produce bad or rough stops; but on long freight trains, particularly at low speeds, a full service application will make a rough stop and under some conditions might make a disastrous one.

### Results of Brake Tests on Freights

Some brake cylinder cards recently taken on a 100-car freight train show what it means when the brakes are ap-

plied on a long freight train. These cards are the average from several tests, and are taken with a 70 lb. train line and a full service application (Fig. 8). They show the pressures in the cylinders on the 1st, 25th, 50th, 75th, and 100th car. It is observed that for 15 sec. after the application is started, there is no pressure in any cylinder between the 50th and the 100th car. In the same time the pressure in the first car has reached 27 lb. or 54 per cent of the normal pressure. If this application had been made when a train of 100 empty cars was traveling at a speed of 20 m.p.h. on a level grade, at the end of the 15th sec. after the start of the application, the first car if left to itself would have been traveling about 10 m.p.h., while the last 50 cars if left to themselves would be traveling nearly 20 m.p.h. The first car if left to itself would travel 325 ft. and the last cars if left to themselves, 438 ft.

You can imagine the strain which must be absorbed by the draft gears under these conditions, particularly when it is realized that the total spring draft gears would be only a little over 20 ft. for the first 50 cars. Again, if this application had been made when the head car was ascending a 1 per cent grade and the rear cars descending a 1 per cent grade, the rear cars at the end of the 15th sec. would have tried to travel about 22½ m.p.h., while the first car wanted to travel about 7 m.p.h.

Fig. 9 shows the cylinder cards for the same cars when the train line reduction was 15 lb. and it is noted that the difference between cylinder pressures for the first 15 sec. is very little if any different from what it was with a full service reduction. A set of cards for a 10 lb. reduction would still show very little difference in these cylinder pressures. A 7½-lb. reduction, however, will show quite a material difference. Of course, with a lesser number of cars in the train this difference in cylinder pressure would be less and the shock during an application of the brakes correspondingly less; but I believe all air-brake experts will agree that a full service application or even a single 15-lb. reduction on freight trains of over 50 cars is at least not good practice and should be avoided if possible.

### The Remedy for Severe Shocks

The reason for these severe shocks during the application of brakes on freight trains is quite obvious. The cylinder cards tell the story. They also clearly suggest the remedy, that is, apply the brakes on all cars at the same time or have solid connections between the cars. The first of these remedies means an entirely different braking system, and the second would be impossible, for several reasons. The cylinder cards also suggest the next best remedy and that is to have as little difference in cylinder pressures as possible during the first part of the application. This requires a low train pipe reduction at the start of the application. The draft gear slack thus will be caused to run in or the cars to "bunch," as it is more commonly called, with a minimum amount of shock. As the cylinder pressures begin to equalize throughout the train, the slack will run out and if another reduction is made after the slack has all run out, there will be the same amount of shock. If the second reduction is made when the slack is all in, it can be a comparatively heavy reduction without causing undue shock. This method of braking is the universal practice on all railroads, not only on long freight trains but on passenger as well. The smoothness of a stop will depend very largely on the time allowed between reductions, and this time will depend upon many things, not only on the class, length, and make-up of the train, but also upon the contour of the track and in a somewhat lesser degree upon the action of the brakes themselves.

It is possible to make a brake application automatically on either a freight train or a passenger train with any amount of train line reduction desired. It is also possible, although perhaps considerably more complicated, to make a split application automatically, but is it possible even with all the ingenuity that mortal man possesses to construct an automatic device which will make a proper brake application for all the varied conditions under which such applications have to be made? Man has made some wonderful automatic devices, but he has never yet made brains, and brains and good ones too, are required to make these applications properly.

### Relation of the Device to Brake System

It would seem, therefore, to be impossible to select a train control system in which the automatic brake applications can be made properly on all trains. Unfortunately, the 49 carriers mentioned in the I. C. C. order, are not relieved from the duty of making a choice. If the system selected is one in which there will be a great number of these automatic brake applications (and I would consider a great number to

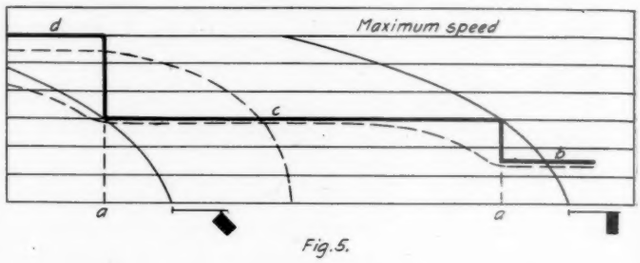


Fig.5.

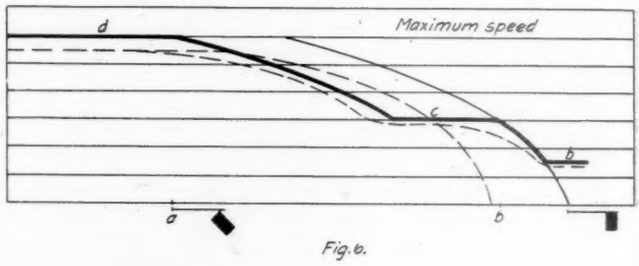


Fig.6.

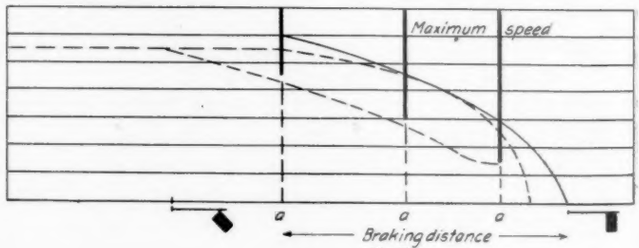


Fig.7.

**Effect on Braking of Trains with Speed Control**

mean every time a train ran through a caution block), it would seem that a low train line reduction of not over 7½ lb. would be the only safe one to make. This, however, brings in another complication. The braking distance of a train is almost inversely proportional to its braking power. A 7½-lb. train line reduction will give less than one-half the available braking power. Hence, the braking distance will be more than twice as long as it would be if the whole braking power were used. It is quite evident that such a system would place a handicap on the capacity and operation of any railroad. On the other hand, if the system selected were one in which these automatic applications were very few, then it is possible that even a full service application could be tolerated. This appears to be the best solution that can be made of this very complicated problem. In order to have automatic applications occur as few times as possible, I should say that one of the most important fundamentals of

a train control system is to have it so organized that an automatic brake application will take place only when an engineman fails properly to control his train when approaching a stop signal.

Releasing brakes on long freight trains is an important question in determining the speed limitations which should be used in applying speed control to railroads. Fig. 10 shows the brake cylinder cards during the release of brakes on a 100-car train after a full service application. It will be noticed that the 100th car does not begin to release for nearly 30 sec. after the release has started. The retarded release action of the K-2 triple valves is quite prominent on the first car but is noticeably absent on the other cars. When a release is made on a train of 100 empty cars moving at a speed of 15 m.p.h. on a level grade, the first car at the end of 15 sec. would, if left to itself, be just about moving, and it would have traveled about 130 ft. The 50th car if left to itself, would stop in about 90 ft. and consume about 6 sec. in doing so. Even if the release on this train were started when the speed was 20 m.p.h., the cars between the 50th and 100th if left to themselves would stop in about 165 ft. and in a little over 10 sec. or some 20 sec. before all the brakes were released. If we consider this 100-car train to be loaded so that its total weight is 5,000 tons, the nominal braking power would be only 24 per cent instead of 60 per cent. Nevertheless, if the release were started when the speed was 20 m.p.h. after a full service application, the train would still be stopped before the brakes were finally released on the rear cars. On trains of this kind it would seem to be impossible to release the train brakes without bringing the train to a stop unless the speed at the time the release started is considerably higher than that at which these trains usually run. With shorter trains and lighter brake applications, the conditions during the release of the brakes are, of course, quite different.

## Some Systems of Train Control

I will now briefly discuss a few of the systems of train control which have been proposed, describing them only as they apply to control diagrams similar to those shown. Figure 1 represents all of the so-called plain automatic stops which conform to the I. C. C. requirements. Types of this system have been proposed where the automatic devices would not be operated if the speed when passing the point *a* was below a certain prescribed amount. Another type of this class has been in use for some time in which the engineman may, if he so desires, annul the operation of the device when passing or after he has passed the point *a*.

So far as I know, no systems of the types illustrated by Figs. 2 and 3 have been proposed. Systems of these types require a speed measuring device to be carried on the train. When such a speed measuring device or speed governor is once provided it is a simple matter to amplify the system so as to make it more applicable to railroad operation. I will only refer to one such system. It is illustrated by Fig. 5. This system as shown is one of the intermittent contact types, although the same scheme of control could be secured by either the intermittent inductive or the continuous control devices. There is a ramp or control point located in the rear of each signal. This system is so organized that when a train passes a control point in the rear of a caution signal, a certain medium speed limit is set up. If this speed is exceeded before the train reaches the control point in the rear of the home signal, the brakes will be applied. When the train passes the control point in the rear of the home signal, a lower speed limit is set up which will continue in effect until a control point is reached where, by reason of the condition of the signal, either a medium or a high speed limit can be allowed.

It is only necessary that these control points be placed from the signals a proper braking distance for the medium speed, instead of braking distance for the maximum speed. In this type of system it is a simple matter to introduce feature *d* referred to above in discussing the requirements of the commission. With feature *d* added to this system, trains controlled by it would have to run below a fixed maximum speed through a block which it had entered by passing a proceed signal, and to avoid an automatic brake application, it would have to be below a certain speed before passing a caution signal. It would have to remain below that speed while running through that block and finally be below a certain pre-arranged lower speed before reaching the stop signal.

Another type which is proposed, and is quite prominent, makes use of the speed restriction line shown in Fig. 4. In order to accomplish this it requires on the train, in addition to a speed measuring device, a distance measuring device. These two measuring devices are so interrelated that when the train passes a control point in approaching a stop signal, the speed limit which is enforced decreases as the train nears the signal. This is perhaps the most ideal scheme of control that has been proposed, but unfortunately it has certain limitations. The speed restriction line in Fig. 4 is technically a braking distance curve for the particular train and block considered. The shape of this curve and more particularly its length will depend upon the grade, not so much perhaps when only passenger trains are considered, but very greatly when heavy freight trains are to be dealt with. It is possible so to control the interrelation between the two measuring devices on the train that any speed line will be produced; but this control must be made to fit the grade of the block in which the train is running.

This is also possible and has been done, but at the expense of a great deal of mechanism and complication. To avoid this complication it is proposed to have the measuring device produce only one curve, but to divide this curve into two parts; one part forming the speed restriction line between maximum and a medium speed, and the other part the speed restriction line between medium and a low speed; and then in applying the system arrange to bring into action these speed restriction lines at such points as are required by the grade.

Figure 6 is a control diagram of this system as it has been proposed. The two curved portions of the speed restriction line are portions of the braking distance curve required for the shortest block to be encountered. They are produced by the two measuring devices and the horizontal portion of the speed control line is produced by the speed measuring device only.

The first part of the speed restriction line is brought into action when a train passes a caution signal and the second part when the train passes a point located at a proper braking distance from the stop signal.

Still another type which is proposed for making use of the control line shown in Fig. 4 is practically a modification of the device required to produce the simple vertical speed restriction line of the plain automatic stop system. This modification consists of so organizing devices carried on the train and devices fixed on the right-of-way, that the automatic brake application will take place only when the speed of a train by a control point exceeds a certain fixed amount. Such a system is simply illustrated by Fig. 6. The light line curve is the actual braking distance curve for this particular block.

By being able to fix the speed at which a train may pass a control point without receiving a brake application with a change in the arrangement of the right-of-way devices only, it is possible easily to fit the system to any grade. Thus each block can be engineered on its own merits and the greater the number of control points used, the nearer a train can run to the maximum possible speed restriction line without receiving an automatic brake application.

# The Money Market and the Employees

THESE TWO FACTORS represent the ultimate issues in the railroad problem, according to Vice-President W. W. Atterbury, of the Pennsylvania Railroad, as set forth in an address which he gave on February 15 before the Philadelphia Music Club. "The forced inability of the managers to make both ends meet and to get new funds to build greater facilities, and the difficulty, under present conditions, of arousing an *esprit de corps* on the part of employees, summarize the railroad situation."

General Atterbury was addressing women, and he opened his address with a quotation from Roger Babson concerning women. Babson said:

"Another thing, avoid what are known as 'Woman Roads.' I refer to those like the Pennsylvania, in which few real red-blooded active men are now interested. The Pennsylvania is largely owned by women, orphans, educational institutions, and a great group of absentee investors. No one in active control has a predominant interest. Whenever corporations reach this stage, they should be avoided. Put your money into railroads that haven't yet become a 'Woman's Road.'"

"Frankly," said the speaker, "I think Mr. Babson paid us a high compliment. At any rate, we are proud of the fact that so many of our stockholders are women. To have a widespread interest of women in the Pennsylvania ownership is an indication of their confidence in the management and the property, and, I assure you, it contributes toward the conservatism, integrity, and soundness, that have always characterized the financial plans and policies of our railroad. It is clear to me that the railroad situation in this country is as much your problem and that of every other intelligent American citizen as it is mine or that of any other railroad man. Whether we have good railroads or bad depends altogether upon what the people themselves desire the railroads to be. One of the difficulties confronting us today arises from the fact that this vital public service, performed day in and day out, under conditions which only railroad men themselves can appreciate, has come to be accepted as commonplace. Its importance is scarcely realized. Its maintenance and expansion to meet the growing needs of the country do not seem to interest those who should be the most concerned."

General Atterbury went on to give a very clear and succinct description of the general railroad problem; and in conclusion, he said:

"If you have a maid or two in your household, you expect to pay her reasonable wages, to give her a day off every week or two, to provide for her comfort and welfare while she is in your employ, to deal directly with her in matters affecting the running of your household and to make things so attractive that she becomes a useful, contented and loyal employee. Suppose, then, that some outside agency, sitting in Washington, determined the amount of money you should have available for your household expenses. Suppose some other outside agency, sitting in Chicago, determined how much you must pay out in wages, what day of the week your maid should have off, and what time she should serve your meals; and that someone whom you did not know and who had no interest whatsoever in your household should have the right to deal with you with respect to your relations with your maid. Suppose also that all these matters were determined on a national basis and that on any and every occasion on which you and your maid could not agree, this outside agency would step in and say what you should do.

"That is not an extreme comparison. It is the railroad labor situation in a nutshell. * * * You ladies are interested in music. What kind of concert would you hear from an orchestra with a half hundred leaders, each having his own ideas of harmony and each catering to the musical tastes of his own particular supporters in the audience?

"In the case of the railroads your interest is that of citizens, of investors, and of householders. Almost half of the 138,000 stockholders who own the Pennsylvania Railroad are women. There is no doubt in my mind that if the women of the country, realizing their three-fold interest in this great transportation industry, would make an effort to know and understand its problems, and support the railroad managers in their efforts to provide adequate railroad services at reasonable cost, the end of our difficulties would be in sight."

# Respite From Federal Legislation Promised

WASHINGTON, D. C.

A NINE-MONTHS' RESPITE from federal legislation and another year of experience under the Transportation Act of 1920 now seem definitely assured since Congress adjourned on March 4 without acting upon any of the important changes in the law proposed in numerous bills which had been introduced throughout the session. One of the principal bills of this character was the Capper bill, on which extensive hearings were held both by the House and the Senate committees, but most of the bills were pigeon-holed by the committees without hearings. While it is expected that a determined attack on the law will be made by the "progressives" at the next session the experience during the balance of this year may be such that there will be much less popular interest in the subject by the time the new Congress meets next December. Apparently the railroads have earned as much as the statutory rate of return for a single month in January for the first time in the three years since the law was passed.

This will be the first time for several years in which Congress has not been in session during the summer. A few bills and resolutions relating to transportation were among those considered the last day or two of the Congressional session.

The Senate on March 2 passed an amendment to Section 206 of the Transportation Act which had previously been passed by the House, to validate suits and judgments against the Railroad Administration notwithstanding the abatement which a recent Supreme Court decision held has occurred if the proper substitution has not been made for the various changes in the name of the director general of railroads and the President's agent to liquidate the affairs of the Railroad Administration.

The Senate on March 2 passed the bill authorizing the Interstate Commerce Commission to certify to the Treasury an additional loan of $3,000,000 to the receivers of the Kansas City, Mexico & Orient and the Texas company, but the bill failed to receive consideration in the House. Such additional loan was to be a prior lien upon the property except as to the loan of $2,500,000 previously made.

A bill to increase the appropriation for the United States Coal Commission from $200,000 to $600,000 was passed by Congress shortly before its adjournment. The commission had stated that unless the additional appropriation were made it would have to discontinue its investigations, which includes the relations between the railroads and the mining industry.

A resolution introduced by Senator Gooding, of Idaho, directing the Interstate Commerce Commission to investigate and report to the Senate a large amount of detail information regarding the administration of Section 4 of the interstate commerce act was adopted by the Senate on March 4.

Senator Sheppard of Texas on March 1 introduced in the Senate a resolution requesting the President, in his discretion, "to renew his good offices in bringing about a settlement of pending controversies between certain railroads and railway shopmen." He was, however, unable to obtain consideration of the resolution before Congress adjourned.

# General News Department

**The Missouri Pacific** has terminated its contract with the Van Noy Interstate Company for the operation of its restaurants and hotels and the restaurants will be operated by the dining car department of the railroad.

**The Interstate Commerce Commission** has authorized the Chicago, Milwaukee & St. Paul to make its installation of automatic train control between Bridge Switch and Hastings, Minn., instead of the points designated in the commission's original order.

**The Society of Terminal Engineers** will hold its next meeting on Tuesday, March 13, at 29 West 39th street, New York City. Charles H. Fischer, chairman of the committee on docks, piers and wharves, of the National Fire Protection Association, will discuss the protection of marine properties against fire.

**Group insurance,** life, accident and health, is to be provided for the shopmen, said to number 10,000, on the Great Northern Railway by the Metropolitan Life Insurance Company, of New York City. The scheme is similar to group insurance arrangements on other roads, but it is said that the shopmen's brotherhood deals directly with the insurance company, the railroad company not being a party to the contract.

## Traveling Engineers To Discuss Train Control

Automatic train control will be one of the topics discussed at the next annual meeting of the Traveling Engineers' Association. The committee on this topic has recently issued a questionnaire requesting information regarding the devices in service, number of engines equipped, length of time device has been in service, the cost of installation and maintenance, and objectionable and desirable features as developed in service.

## A. R. E. A. Dinner Speaker

Judge Harry V. Osborne, president of the New Jersey Board of Utility Commissioners, Trenton, N. J., will speak at the annual dinner of the American Railway Engineering Association at the Congress hotel on Wednesday evening, March 14. As announced in the *Railway Age* of last week, other speakers at this dinner will be Hon. F. B. Carvell, who will talk on Canadian railway problems, and Floyd M. Parsons, editor and journalist, who will speak on "looking ahead."

## Illinois Senate Investigates Transportation

A commission has been created by the Senate of Illinois to study transportation conditions in the state. The commission will investigate steam roads, waterways and projected waterways with relation to their effect on railroad revenues and service and hard roads, including the use of heavy trucks and buses in competition with railroads which the hard roads parallel.

## Highway Crossing Danger is Artificial

"The highway crossing danger is inherently artificial." This is a significant phrase in a news item recently given out by the Southern Pacific, calling attention to the fact that the total of the fatalities resulting from accidents to automobiles at grade crossings, on the lines of the Pacific System, was seven per cent less in 1922 than in 1921. The company expresses appreciation of the co-operation of the press, the automobile clubs, schools, churches and chambers of commerce. Fifty-three persons were killed and 316 injured as compared with 57 and 283 in 1921. The danger is called artificial because it is "a danger created by the driver in not exercising a reasonable degree of precaution." *Stop, look and listen* should be the invariable rule. Another necessary rule is, never attempt to shift gears while close to the tracks, or while on the crossing.

## Crossing Flagman Quits in Disgust

John McMahon, crossing flagman at Shelby, Ohio, for the Cleveland, Cincinnati, Chicago & St. Louis, has resigned; and, according to a news item given out by the railroad company, he found it necessary to quit because reckless automobile drivers, disregarding his stop signals, had become so numerous that he classes himself as a nervous wreck. Less than four years ago, when he took the job, he was sound in mind and body. "The wild drivers smash through gates just as if they were meant to be broken down," says McMahon. And the flagman himself, if he is not alert and quick on his feet, is likely to get hit. The press agent of the railroad says that other crossing flagmen make somewhat similar reports. McMahon is a bachelor, 66 years old, and had worked in the roadway department 35 years before he became a flagman.

## Boardwalk Flyer Derailed by Automobile

The Boardwalk Flyer, one of the fast express trains of the Philadelphia & Reading between Camden, N. J., and Atlantic City was derailed near Hammonton, N. J., on March 2 by striking an automobile which had become stalled on a crossing. The occupant of the automobile was killed and the engineman, Robert Hammill, was injured. The accounts say that Hammill had been in the service 46 years but never before had been in a fatal wreck.

## Membership of A. R. A. Advisory Committee

The Advisory Committee (heretofore known as the Conference Committee) appointed by the directors of the American Railway Association last autumn to attend to any necessary consultations at Washington, in connection with transportation and car service matters, has been enlarged, and now consists of W. W. Atterbury (Penn.); Ralph Budd (Great Northern); B. F. Bush (Mo. Pac.); H. E. Byram (C. M. & St. P.); C. R. Gray (Union Pacific); Hale Holden (C. B & Q.); J. H. Hustis (B. & M.); J. Kruttschnitt (So. Pac.) N. D. Maher (N. & W.); W. L. Mapother (L. & N.); C. H. Markham (Ill. Central); A. H. Smith (N. Y. C.) and Daniel Willard (B. & O.). Mr. Willard is chairman of the committee.

## President Regrets Failure to Settle Shop Strike

President Harding has written the following letter to Stephen E. Connor, self-styled "secretary of the federated shopcrafts on the Central of New Jersey":

"Your letter of March 3 comes to hand just as I am about leaving for the South, but I am glad of the opportunity it affords me to express my sentiments on this subject. You tell me that the shopcrafts of the New Jersey Central Railroad are staging a relief fund movement and ask me to send my autographed photograph. I am gladly complying. It is occasion of intense regret that the settlement of the shopcraft strike, which has been effected on the larger part of the railroad systems and mileage of the country, has not been found possible on all the rest. I do not find myself able to discern any adequate question of principle which could justify a minority of the interests involved in this distressing situation in refusing to make settlements similar to those which have been made by the majority. The information which reaches me brings the conviction that continued failure to make settlements is largely responsible for unfortunate conditions as to railroad movements in some areas, and for interrupted deliveries of coal during the winter, with resultant suffering to many communities, and much demoralization to industry. It is a

situation which seems certain to become more serious unless effective measures are found for its early amelioration."

The identity of "Connor" is not established. His letter awaits him unclaimed at Jersey Central headquarters and officers of the road say he is not in their employ.

## New Regions of the Canadian National Railway

Effective March 1, the Canadian National, with which the Grand Trunk has been consolidated, was divided into the following regions:

Atlantic—comprising all lines and facilities east of Riviere du Loup and Monk, Que. (including Riviere du Loup terminal, but not Monk terminal)—headquarters at Moncton, N. B.

Central—comprising all lines and facilities between Riviere du Loup and Monk, Que., on the east, and Chicago, Ill., Current and Superior Junction, Ont., on the west (including Monk terminal, the line to Portland, Me., and the Grand Trunk Western, also associated lines in the United States west of the Detroit and St. Clair rivers)—headquarters at Toronto, Ont.

Western—comprising all lines and facilities west of Current and Superior Junction, Ont. (including the Duluth, Winnipeg & Pacific Railway)—headquarters at Winnipeg, Man.

Central Vermont Railway—comprising all lines and facilities south of Iberville, Que.—headquarters at St. Albans, Vt.

## Operating Statistics

The number of net ton miles of revenue and non-revenue freight handled by the Class I railroads in 1922 was about 9 per cent greater than that for the preceding year, according to the summary of operating statistics issued by the Interstate Commerce Commission. The total was 375,617,000,000 as compared with 344,911,000,000 in 1921. The average car miles per car day was 23.5 as compared with 22.4, the net ton miles per car day 424 as compared with 389, and the net tons per loaded car 26.9 as compared with 27.6. The average train load was 677 tons as compared with 651 tons the year before and the net ton miles per mile of road per day averaged 4,405 as compared with 4,052. There was a decrease in the average train speed from 11.5 to 11.1 miles per hour. The locomotive miles per locomotive day increased from 49.5 to 52.0. There was an increase of approximately 5,000,000 tons in the consumption of coal from 70,303,281 in 1921 to 75,530,790 in 1922, but the increase in pounds of coal per thousand gross ton miles was only from 162 to 163.

## Fuel Association Convention Program

Julius Kruttschnitt, chairman of the executive committee of the Southern Pacific, will deliver the opening address at the convention of the International Railway Fuel Association to be held at the Hotel Winton, Cleveland, Ohio, on May 21-24. An address will also be made by T. K. Maher, president of the Maher Collieries Company. A partial list of the papers to be presented is as follows: Extension of Locomotive Runs, by C. B. Peck, associate editor, *Railway Age;* Considerations Covering Use of Oil as a Locomotive Fuel, by M. C. M. Hatch, mechanical engineer, M. K. & T.; Fuel Saving Aspect of Boiler Water Treatment, by C. R. Knowles, superintendent water service, Illinois Central; Value of Individual Fuel Performance Records, by L. G. Plant, editor, Railway Review; Standardization of the Coal Business, by George H. Cushing; The Other Ten Per Cent, by R. S. Twogood, assistant engineer, Southern Pacific; Economic Aspects of the Fuel Oil Situation, by C. E. Beecher, U. S. Bureau of Mines; Economy in the Heating of Stations and Buildings, by Prof. R. W. Noland, Purdue University; Incentives for Promoting Fuel Economy, by O. S. Beyer, Jr.

There will also be a topical discussion of the paper on the Effect of Tonnage Rating and Speed on Fuel Consumption presented by J. E. Davenport at the 1922 convention.

## Highway Crossing Accidents in Pennsylvania

Accidents at grade crossings of highways and steam railroads in the state of Pennsylvania, during the year 1922, as reported by the Public Service Commission of the state, numbered 682, in which 138 persons were killed and 488 injured. Of the 682 accidents, about 80 per cent involved automobiles; and the remainder had to do with street cars, jitneys, wagons and pedestrians. The total number of persons killed was 20 per cent greater than in the preceding year and of injured, nine per cent.

The total number of public grade crossings in the state is 11,698, of which 18 per cent are protected by gates, watchmen, bells, etc. The statement issued gives some details of interest: 32 accidents occurred at partially protected crossings during the time that they were not protected; three persons killed, 30 injured. Fourteen accidents at protected crossings due to gates not being lowered; six killed, 10 injured; two due to gates being out of order; one killed, one injured; one due to bell being out of order; two killed, three injured. Fourteen accidents occurred to crossing watchmen while on duty; four killed, 10 injured. Automobile accidents at grade crossings on Sunday numbered 56; persons killed, 15; injured, 60.

Of pedestrians killed and injured at crossings protected by gates, 86 per cent are entered as having been injured because of crawling under gates.

## Wage Statistics for December

Returns to the Interstate Commerce Commission from Class I railroads for the month of December, 1922, show a total of 1,788,590 employees, a decrease of 31,873, or 1.8 per cent, as compared with November employment. The total compensation was $247,672,515, a decrease of $1,614,198, or 0.6 per cent. Owing to seasonal fluctuation, the number of employees in the maintenance of way and structures group shows a decrease of 46,473. The employment in the maintenance of equipment and stores group continue to increase, however, the number of employees being greater in December, 1922, than in any other month reported under the new classification. Forty-two roads reported $2,850,847 in payments to employees for loyal service performed during the shopmen's strike, which amount is not included in this summary.

Compared with the previous month, the increase or decrease (D) in the number of employees, by groups, was as follows:

| | |
|---|---|
| Executives, officials and staff assistants | 67 |
| Professional, clerical and general | D 2,049 |
| Maintenance of way and structures | D 46,473 |
| Maintenance of equipment and stores | 12,644 |
| Transportation (other than train, engine and yard) | D 1,783 |
| Transportation (yardmasters, switch tenders and hostlers) | 444 |
| Transportation (train and engine service) | 5,277 |
| Net decrease | D 31,873 |

A comparison of the number of employees and their compensation, by months, follows:

| Month | Number of employees | Total compensation |
|---|---|---|
| December, 1921* | 1,637,151 | $214,921,396 |
| January, 1922* | 1,552,014 | 205,178,639 |
| February, 1922* | 1,545,040 | 194,523,427 |
| March, 1922* | 1,570,158 | 216,704,408 |
| April, 1922 | 1,578,133 | 203,413,071 |
| May, 1922 | 1,628,228 | 216,672,028 |
| June, 1922 | 1,685,414 | 222,932,689 |
| July, 1922 | 1,467,824 | 193,571,244 |
| August, 1922 | 1,594,074 | 224,976,644 |
| September, 1922 | 1,708,591 | 238,735,394 |
| October, 1922 | 1,804,315 | 255,514,000 |
| November, 1922 | 1,820,463 | 249,286,713 |
| December, 1922 | 1,788,590 | 247,672,515 |

*Excludes Detroit, Toledo & Ironton Railroad.

## Proposed Additional Government Loan to the Orient

The Senate committee on interstate commerce on February 24 reported to the Senate a recommendation that the Interstate Commerce Commission be empowered to loan to the Kansas City, Mexico & Orient $3,000,000 in addition to the loan of $2,500,000 already made from the revolving fund created by the transportation act. This is proposed as a substitute for the bill introduced by Senator Sheppard contemplating an extension of the present loan for 20 years and the cancellation of interest charges during that time. The committee consulted with Chairman Meyer of the Interstate Commerce Commission, who said that in order to avert the possible calamity of the abandonment of operation of the road, Division 4 of the commission would look with favor upon an authorization from Congress which would enable the commission from time to time to advance moneys out of the revolving fund to the Orient to the extent that the public interest may require. "Under this kind of Congressional authorization," he said, "we believe the continued operation of the Orient could be assured."

The Senate committee expressed the opinion that under all the circumstances the commission should be given the authority sug-

gested in Chairman Meyer's letter, saying: "While it is true that during federal control ample compensation for the use of the property was made by the government, when it was turned back, instead of being turned back with its freight traffic as it was on January 1, 1918, it was really turned back with a great part of its business diverted by the act of the government, and the committee feels that the government owes it to the communities served by this railroad that a fair opportunity be given it to recover.

"There is no real danger of a loss of the money, because the government's lien will be a first lien and if the road be eventually abandoned and the property sold as junk the Interstate Commerce Commission estimates that it will bring seven or eight millions of dollars, so that the present bill means simply a loan that will ultimately be paid, and not a gift.

"It is hoped that the order of the commission entered on the 9th of August, readjusting the divisions of joint rates on traffic interchanged between the Kansas City, Mexico & Orient lines and their connections, will in a reasonable time increase the revenues so that the road will be self-sustaining."

## Signal Section Program

The following is the tentative program for the annual meeting of the Signal Section of the American Railway Association, which will be held at the Drake Hotel, Chicago, on March 13, 14 and 15. The morning session will begin at 10 o'clock and the afternoon session on Tuesday, March 13, at 2 o'clock. On Wednesday and Thursday, morning sessions only will be held, in order to allow those present to attend the convention of the American Railway Engineering Association and the exhibit of the National Railway Appliances Association at the Coliseum:

FIRST DAY, TUESDAY, MARCH 13

*Morning Session*

Chairman's address.
Report of secretary.
Committee VIII—A. C. Automatic Block Signaling.
Committee II—Mechanical Interlocking.
Committee XII—Contracts.

*Afternoon Session*

Paper by C. A. McCune, Page Steel & Wire Company.
Committee IX—Wires and Cables.
Committee XI—Batteries.
Committee XX—Highway Crossing Protection.
Committee V—Maintenance, Rules and Instructions.
Committee III—Power Interlocking.

SECOND DAY, WEDNESDAY, MARCH 14

*Morning Session*

Committee XIII—Electrical Testing.
Committee XIX—Economics of Railway Signaling.
Committee VI—Standard Designs.
American Engineering Standards Committee.

THIRD DAY, THURSDAY, MARCH 15

*Morning Session*

Committee IV—D. C. Automatic Block Signaling.
Committee XVIII—Direct Current Track Circuits.
Committee XVII—Pole Lines.
Regulation.
Committee VII—Direct Current Relays.
New Business, election and installation of officers.
Adjournment.

## Traveling Salesmen's President Excited Over Railroads' Fight on Mileage Book Ruling

A. M. Loeb, president of the National Council of Traveling Salesmen's Associations, called a "protest mass meeting" of "traveling salesmen and all business interests" at the Hotel Astor, New York, on March 15 to express indignation at the railroads' decision to fight the mileage book order granting a 20 per cent reduction in rates to those who travel 2,500 miles a year or more.

A large poster printed in three colors was issued to advertise the meeting. Its conclusion read as follows:

"Do you want the 20 per cent mileage reduction? Do you want the 50 per cent Pullman surcharge eliminated? If so, show your colors."

The salesmen's national council publishes a small monthly newspaper. Its February issue is largely devoted to the mileage book order and to the bill in Congress making mandatory the repeal of the Pullman surcharge. There are photographs of the President signing the mileage book bill, A. M. Loeb of the salesmen's council reading congratulations to Senator Watson who introduced the bill and a facsimile of the bill, now pending, to repeal the Pullman surcharge.

## Good Will to France—Ten Cents a Vote

The Baltimore & Ohio reports that the participation of the officers and employees in the "National Good Will Election" has resulted in the choice of Miss Nina Spengler as the representative of that road on the committee that is to go to France in the month of April in accordance with the offer which has been made by the American Committee for Devastated France. The employees of the railroad and their friends, paying 10 cents with each vote, cast 181,355 ballots for Miss Spengler, which was 87,201 more than the number cast for the next highest candidate. Because of the magnitude of the vote, the railroad company will be entitled to send a second delegate. The American Committee, for the purpose of raising funds to continue the work begun by it in 1917, has planned these elections in various business establishments employing large numbers of women. The delegates go at the expense of the committee.

On the Baltimore & Ohio, W. W. Wood, representing the management, made a tour of the system, speaking to employees at the shops and at the principal terminals; and groups of girls from the main offices at Baltimore also visited various cities soliciting votes for Miss Spengler. Mr. Wood used a motion picture to illustrate conditions in France.

Miss Spengler is the daughter of C. W. Spengler, agent at Strasburg Junction, Va., and was born in Strasburg, in 1895. She graduated from Lynchburg College in 1915, and entered the service of the Baltimore & Ohio in 1918 in the office of the auditor of merchandise receipts.

President A. H. Smith, of the New York Central, has announced that an election under the auspices of that company will be held between March 12 and April 7 to choose two delegates to go to France from among the women employed by that company in New York City and the metropolitan district. There must be as many as 60,000 ballots returned; and if 120,000 or more shall be cast, two New York Central delegates may be sent. Preliminary to this election, nominating petitions are being circulated for the purpose of selecting nine women as candidates. This is for the purpose of giving an equal opportunity to employees in different departments of the service. All women employees over 18 years of age are eligible for nomination as candidates. Nominating petitions are to be returned by March 10. Delegates who go to France will be excused from service during the period of the trip and their salaries will be paid in full. F. H. Meeder, assistant controller, is chairman of the committee in charge on the New York Central.

Women from various American cities went to France in this way last year. The purpose of the American committee in adopting this plan for raising money is to give representatives of American contributors an opportunity to see what the committee has accomplished in past years.

## New Rules for Clerical Employees

New rules governing the extent of seniority districts, vacations, sick leaves, and Saturday afternoon service of railway employees who are members of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, and employed by the New York, New Haven and Hartford and the Central New England, were announced by the Railroad Labor Board on March 6. The Board held that the following rules covering points which could not be decided by representatives of the carrier and of the employees are just and reasonable and should be made effective March 16:

Rule 6.—Seniority districts. The territory under the jurisdiction of the division master mechanic, division engineer, division storekeeper, and office forces of the division trainmaster, respectively, shall constitute seniority districts for the employees on each operating division under the jurisdiction of each of these officers. The rule as proposed by the employees establishing seniority districts for the employees at stations where there are not exceeding three employees is considered just and reasonable and shall be adopted.

Rules 31 to 39, inclusive.—Rules pertaining to discipline and grievances designated as Nos. 31, 32, 33, 34, 35, 36, 37, 38 and 39, covering respectively, investigation, hearing, appeal, further appeal,

grievances, representation, right of appeal, advice of cause, and exoneration, shown in the joint submission of the employees and carrier following conferences held pursuant to Decision No. 119, as agreed to for all employees except those in the operating department, shall apply to the employees in said department. The request of the carrier for the retention of the rule contained in the 1917 agreement is denied.

Rule 72.—Vacations.—Clerks who on January 1 have been in continuous service of the carrier one year or more will be granted annual vacations with pay provided the work is kept up by other clerks and there is no expense to the carrier involved in granting the vacations.

Heads of departments when granting vacations will give clerks who on January 1 have been in the service continuously one year and less than two years, one week or six working days; those in the service two years and less than three years, ten days, or nine working days; those in the service three years and over, two weeks, or twelve working days.

Rule 73.—Sick Leave.—Where the work of an employee is kept up by other employees without cost to the carrier, a clerk who has been in the continuous service of the carrier one year and less than two years, will not have deduction made from his pay for time absent on account of a bona-fide case of sickness until he has been absent six working days in the calendar year; a clerk who has been in continuous service two years and less than three years, nine working days; a clerk who has been in continuous service three years or longer, twelve working days. Deductions will be made beyond the time allowance specified above.

The employing officer must be satisfied that the sickness is bona-fide, and that no additional expense to the carrier is involved. Satisfactory evidence as to sickness in the form of a certificate from a reputable physician, preferably a company physician, will be required in case of doubt.

The above limits of sick leave may be extended in individual meritorious cases and under the conditions specified, but only by agreement of the representatives of the carrier and of the employees.

Rule 74.—Saturday afternoon service. Only such employees as are in the judgment of the management, necessary to perform the business of the carrier shall be required to work on Saturday afternoons, and no deduction shall be made from the pay of employees relieved.

While these rules apply, under the terms of this decision, only to the New Haven and the Central New England they are important in that it is believed that eventually they will be extended to apply to all carriers on which the points covered have not been agreed upon.

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THE STATION AGENT should build and maintain an organization that will enable him to render the best possible service. Prudence should be exercised in the selection of new employees. It is an injustice to the applicant, as well as to the railroad company, to employ one who is not fitted for the duties of the position.—*C. G. Johnson.*

AIR SERVICES

Thos. Cook & Son are Passenger Agents for the principal Companies operating Aerial Lines, and arrangements for airplane journeys may be made at our offices.

Following are some of the arrangements already announced

SERVICES IN EUROPE

MANCHESTER, LONDON
Daimler Airways.
By Airplane each weekday from Manchester (Alexandra Park) at 9.30 a. m. From London to Manchester at 12.45 p. m

LONDON AND PARIS
Handley-Page Transport, Ltd.
By Airplane daily from London (Croydon )at 12.00 noon From Paris (Le Bourget) daily at the same hour.
Cie. Des Grands Express Aériens.
By Airplane each week day from London (Croydon) at 11.00 a. m From Paris (Le Bourget) at the same hour
Cie. Messageries Aériennes, Paris.
By Airplane daily from London (Croydon) at 1.00 p. m From Paris (Le Bourget) at 12.00 noon

LONDON, PARIS, LAUSANNE, GENEVA
Cie. Des Grands Express Aériens.
By 12-seater Airplane from London every Monday and Friday at 11.00 a. m., arriving Paris 2.45 p. m. From Paris to Lausanne and Geneva on Saturdays at 9.00 a. m., arriving Lausanne about noon From Geneva every Monday at 8.00 a. m

LONDON, BRUSSELS, COLOGNE
Instone Air Line.
Airplane week days from London (Croydon) at 11.00 a.m., Brussels, 2.00 p. m.; from Cologne 10.00 a. m.; Brussels, 12.00 noon

LONDON, PARIS, LYONS, MARSEILLES
Cie. Messageries Aériennes.
By 12-seater Airplane from London every Monday and Friday at 3.00 a. m., arriving Marseilles about 5.30 p. m. From Marseilles every Tuesday and Saturday at 7.00 a. m., arriving London about 3.30 p. m.

LONDON, BRUSSELS, COLOGNE
Instone Air Line, Ltd.
Airplane week days from London (Croydon) at 11.00 a. m., Brussels, 2.00 p. m. From Cologne at 10.00 a. m.; Brussels, 12.00 noon

LONDON, ROTTERDAM, AMSTERDAM
Royal Dutch Air Service Co., Ltd., and Daimler Hiré, Ltd., Joint Service.
Week days from London (Croydon) at 10.00 a. m and 12.15 p. m From Amsterdam at 9.50 a. m. and 11.30 a. m

PARIS, BRUSSELS, ROTTERDAM, AMSTERDAM
Cie. Messageries Aériennes, Paris.
Daily (except Sunday) from Paris, at 10.30 a. m., returning from Amsterdam at 10.40 a. m.

PARIS, HAVRE
Cie. Messageries Aériennes.
Service connecting with Transatlantique steamers from Havre to New York

PARIS, CHERBOURG
Cie. Messageries Aériennes
Service connecting with Cunard and White Star Liners from Cherbourg to New York

PARIS, STRASBOURGH, PRAGUE, WARSAW AND PRAGUE, VIENNA, BUDAPEST, BUCHAREST, CONSTANTINOPLE
Cie. Franco-Roumaine de Navigation Aérienne.
From Paris daily at 7.00 a. m. to Strasbourg and Prague From Prague daily at 9.00 a. m. to Warsaw From Prague daily at 9.00 a. m. to Budapest and Vienna From Vienna daily at 11.30 a. m. to Budapest. From Budapest every Monday and Wednesday at 8.00 a. m. to Bucharest. From Bucharest every Tuesday and Saturday at 9.00 a. m. to Constantinople
From Constantinople every Monday and Wednesday to Bucharest. From Bucharest every Tuesday and Saturday at 9.00 a. m. to Budapest. From Budapest daily at 9.00 a. m. to Vienna and Prague. From Vienna daily at 11.15 a. m. to Prague. From Warsaw at 11.00 a. m. to Prague. From Prague daily at 9.00 a. m. to Strasbourg and Paris

TOULOUSE, CASABLANCA—CASABLANCA, ORAN
Cie. Générale des Entreprises Aéronautiques.
Airplane daily in each direction, calling at Barcelona, Alicante, Malaga and Rabat, the journey occupying two days, spending one night at Malaga. From Casablanca to Oran and vice versa every Thursday and Saturday, calling at Rabat and Fez.

*From the Circular of Thomas Cook & Son*

**The Latest in Time Tables**

# Traffic News

The consolidated ticket office at Cincinnati, Ohio, was abandoned on March 2. Separate offices will be established in the Dixie Terminal building by most of the lines that used the common office.

The Buffalo Passenger Association has been formed at Buffalo, N. Y., by representatives of the rail and boat lines doing business in that city, and a banquet was held at the Hotel Statler on Saturday night, March 3, with about 100 in attendance. C. M. Knowles is president of the new association and C. W. Beardsell, secretary.

A resolution calling upon the Interstate Commerce Commission to report all matters relating to the administration of paragraphs 9, 10 and 11 of Section 5 of the interstate commerce act, relating to the operation and control of water lines, was adopted by the Senate on February 27 at the request of Senator Ashurst of Arizona.

The Illinois Central has purchased in north central Iowa 20 registered Jersey bulls, which will be distributed along its lines in the south, and will be used by southern farmers without charge. A special train to distribute these bulls started from Fulton, Ky., on February 26 through Tennessee, Mississippi and Louisiana. Lectures and demonstrations were given by dairy specialists accompanying the train.

The movement of export grain over the Pennsylvania Railroad, is continuing at a volume exceeding all previous records. During January, 10,858,700 bushels were delivered at Philadelphia and Baltimore, the heaviest movement ever recorded in a single month. One lot of 230,000 bushels went via Norfolk, Va. This grain moved from Buffalo, N. Y., via Harrisburg, Pa., Perryville, Md., and Cape Charles, Va., thence by car ferry to Norfolk, where it was delivered to the new municipal elevator.

At the annual meeting of the Transportation Club of Peoria (Illinois) on February 27, N. M. Love, district freight representative of the Pennsylvania, was elected president; V. V. Boatner, president of the Peoria & Pekin Union, and O. F. Becker were elected vice-president, and O. B. Eddy was elected secretary-treasurer. The directors elected were: W. H. Wylie, S. L. Mathis, W. A. Bartlett, L. L. Gruss and J. Younge. J. L. Kent was elected director to fill the unexpired term of G. A. Smith, deceased.

The Interstate Commerce Commission on March 5 issued a service order directing the New York, New Haven & Hartford to permit the docking of the vessel "Maumee" out of its turn at Belle Dock, New Haven, Conn., and to give preference and priority in the placement of cars at the dock for the transportation of coal consigned to the Springfield Gas Light Company, Springfield, Mass. (62 miles inland). If the boat were required to wait its turn, said the order, it would take from two to three weeks and the gas company's stock of coal would be exhausted.

## Anthracite Shipments in January

The shipments of anthracite for the month of January, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 6,671,822 gross tons, as compared with 4,848,053 gross tons during the corresponding month last year, an increase of 1,823,769 tons, or 37.6 per cent. January of this year also showed an increase of 216,946 tons over the preceding month (December) when 6,454,876 tons were shipped to market.

Shipments by originating carriers were as follows:

| | January 1923 | December 1922 | January 1922 |
|---|---|---|---|
| P. & R. | 1,381,359 | 1,259,927 | 1,952,872 |
| L. V. | 1,093,052 | 1,107,745 | 766,602 |
| C. of N. J. | 588,093 | 564,071 | 542,558 |
| D. L. & W. | 1,038,719 | 938,530 | 744,768 |
| D. & H. | 741,739 | 832,893 | 619,762 |
| Penna. | 596,989 | 561,603 | 331,871 |
| Erie | 750,277 | 738,073 | 466,495 |
| N. Y. O. & W. | 178,072 | 159,829 | 101,779 |
| L. & N. E. | 303,522 | 292,205 | 221,346 |
| | 6,671,822 | 6,454,876 | 4,848,053 |

# Commission and Court News

## State Commissions

The Public Service Commission of Georgia on February 28 issued its final order, following extended hearings, and to go into effect on May 1, requiring the reconstruction of freight rates throughout that state, abolishing the basing point system which has been in force for many years, and making rates in general according to distance. It is said that the number of decreases which will result from the proposed changes is very much larger than the number of increases. The railroads of the state are reclassified, and now are all included in two classes, class A and class B.

## Personnel of Commissions

Richard Sachse, chief engineer of the California Railroad Commission has resigned to engage in private business at Los Angeles, Cal.

L. S. Ready, assistant chief engineer in charge of the gas and electric division of the California Railroad Commission, has been promoted to chief engineer, succeeding Richard Sachse, resigned. A. V. Guillou, assistant engineer in the gas and electric division, has been promoted to engineer in charge of the gas and electric division and the position of assistant chief engineer has been abolished.

## Supreme Court of the United States

### Cost of Private Siding Includes More Than Material and Labor

The Western & Atlantic sought, in the Federal District Court for the Northern District of Georgia, to enjoin the enforcement of an order of the Georgia Railroad Commission requiring the construction and maintenance of a spur track to a warehouse abutting on its right of way at Smyrna, as being unreasonable and arbitrary, and a burden on interstate commerce. The defendants, among other things, denied that the value of the matter in controversy amounted to the $3,000 necessary to give the Federal Court jurisdiction. The complaint alleged that the initial cost of the construction of the spur would be $1,266.24; that interest thereon, depreciation and operating expenses would exceed $200 a year, and its earnings would not be increased, as the truck could never be used by other patrons. The district court denied the application for temporary injunction on the sole ground that the requisite amount to give jurisdiction was not involved. That court said: "The cost in material and labor is stated in the petition to be but $1,260, and this amount alone is involved. * * * The cost of future maintenance is not involved now because that is an incident of the future use."

The Supreme Court of the United States reverses the order of the district court declining jurisdiction. The court says, in part: "We are unable to agree that the cost in material and labor is all that is involved in this case. Plaintiff seeks to be relieved not only from constructing the side track, but also from maintaining it in suitable condition for use, and from the cost and expense of using and operating it for the movement of cars to and from the warehouse. The value of all these is involved. It is shown that the permanent annual burden on account of interest on such cost, depreciation, maintenance and operating expenses of such side track will exceed $200, and this capitalized at a reasonable rate exceeds $3,000. Laying aside other considerations bearing upon the matter, the amount is shown to be sufficient. This being so, the District Court should have taken jurisdiction and should have proceeded to determine the merits of plaintiff's application for a temporary injunction, which it did not do."—Western & Atlantic v. Railroad Commission of Georgia. Decided February 19, 1923. Opinion by Justice Butler.

# Foreign Railway News

### 2000 Cars to Be Built in Chile

The Chilean government has decided to place an order for 2,000 steel freight cars to be built in Chile, according to Commerce Reports.

### Chinese Road Purchases American Cars

The Tientsin-Pukow Railway of China has purchased 5 mail cars, 5 baggage cars, 5 dining cars, 5 parlor cars, 30 sleeping cars and 3 private cars in this country for use on its lines, according to advice from Consul J. K. Davis of Nanking.

### Austria Needs Funds for Railroad Electrification

The electrification bureau of the Austrian federal railways has just published a statement to the effect that further progress in the electrification of the Austrian Alpine railways is jeopardized because of lack of funds, according to a report to the Department of Commerce from Consul R. W. Heingartner, Vienna. Water-power construction work is far advanced in the Arlberg district, but expenses have risen so greatly that construction work has had to be reduced and laborers dismissed because the government is unable to advance the necessary funds.

It was planned to complete the electrification of the Federal Alpine railways by the end of 1926. The total cost yet to be covered is 177,000,000 gold crowns (about $35,400,000). What is needed, says Consul Heingartner, is foreign capital to subscribe to an electrification loan in order that the development of hydro-electric power may not be subject to further obstacles.

### British Railways Make Over-Night Deliveries of Perishables Up to 500 Miles

The desire of the British railway companies to assist the home farming industry, apart from the vexed question of rates, is revealed in the character of the railway services placed at the disposal of those engaged in it, according to the Times (London). Excellent provision is made for example, for seasonal traffic.

Many instances of the facilities given could be quoted, but one or two will suffice. Strawberries picked at Swanwick are consigned via the London & South-Western section of the Southern Railway and can be eaten in Glasgow (about 500 miles) within twenty-four hours, not as an exceptional, but as a regular occurrence. From the South-Eastern section of the Southern Railway, by passenger and goods trains, about 1,500 tons of fruit, vegetables, and meat are handled daily during the period of heavy traffic by special trains, which deliver to the London market and many provincial centres by the running of through cars.

From the Great Eastern territory 50,000 tons of fruit and 14,000 tons of green peas are carried to market during the season, traffic being accepted up to 5 p. m. one day for delivery to the next morning's markets at a number of distant destinations.

The seasonal traffic from the Worcestershire area (about 120 miles northwest from London) in farm produce is handled in a series of special trains by the Midland section of the London, Midland & Scottish Railway. Freshly-gathered fruit and vegetables are delivered into the markets of Edinburgh and Glasgow early on the following morning. At the present time large consignments of vegetables are being made from the Penzance district (in the extreme southwest of England, 305 miles from London) and the Scilly islands to all parts of the country.

Following this there will be a heavy traffic in potatoes from the Isle of Jersey, and, at a later period, special arrangements have to be made for handling the Channel islands' tomato crop. The regular and special freight trains conveying perishable food supplies are all run at express freight train speeds, and take precedence over ordinary goods traffic. Considerable use is also made in the consignment of farm and dairy produce by passenger trains, and rates for parcels by these services were reduced at the commencement of the present year to a point below the parcels post rate.

# Equipment and Supplies

## Locomotives

THE DELAWARE, LACKAWANNA & WESTERN is inquiring for 10 milk cars.

THE BALTIMORE & OHIO has reserved space for a number of locomotives.

THE BELT RAILWAY OF CHICAGO is inquiring for five 8-wheel switching locomotives.

THE ATLANTIC COAST LINE has ordered 50 locomotives from the Baldwin Locomotive Works.

THE MCKINLEY LAND & LUMBER COMPANY has ordered one locomotive from the H. K. Porter Company.

THE CHILEAN STATE RAILWAYS have ordered 25 Mikado type locomotives from the Baldwin Locomotive Works.

THE STUDEBAKER CORPORATION has ordered one 6-wheel switching locomotive from the American Locomotive Company.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE, reported in the *Railway Age* of February 17 as contemplating the purchase of a small number of locomotives, has ordered three 6-wheel switching locomotives from the American Locomotive Company.

THE SOUTHERN PACIFIC, reported in the *Railway Age* of February 24 as inquiring for 34, 2-10-2 type locomotives, 6 Pacific type and 10 Mountain type, has ordered the 34, 2-10-2 type, and the 6 Pacific type, from the Baldwin Locomotive Works, and the 10 Mountain type from the American Locomotive Company.

## Freight Cars

THE FORD MOTOR COMPANY is inquiring for 50, 50-ton gondola cars.

THE ERIE is inquiring for 2,000, 70-ton all-steel drop-bottom gondolas and 2,000, 40-ton box cars.

THE JACOB DOLD PACKING COMPANY, Buffalo, N. Y., will build 50 refrigerator cars in its own shops.

THE CAMBRIA & INDIANA contemplates coming in the market soon for a number of 50-ton coal cars.

THE EMMONS COAL MINING COMPANY, Philadelphia, Pa., is inquiring for 200 steel hopper cars of 50 tons' capacity and 300 steel hopper cars of 70 tons' capacity.

THE FRUIT GROWERS EXPRESS, reported in the *Railway Age* of March 3 as inquiring for 2,000 steel underframes for refrigerator cars, is also inquiring for 500 complete refrigerator cars.

THE LOUISVILLE & NASHVILLE, reported in the *Railway Age* of March 3 as inquiring for 4,000 hopper cars and 2,000 composite gondola cars, is also inquiring for 2,000, 40-ton box cars.

THE NEW YORK CENTRAL has ordered 100 Hart convertible ballast cars of 50 tons' capacity from the American Car & Foundry Company. These cars are for use on the Michigan Central Railroad.

THE REPUBLIC IRON & STEEL COMPANY, reported in the *Railway Age* of February 3 as inquiring for 50 flat bottom gondolas of 70 tons' capacity, has ordered this equipment from the Standard Steel Car Company.

THE NEW YORK CENTRAL has placed orders for 4,000 cars as follows: To the Standard Steel Car Company 1,500 cars of 70 tons' capacity and 500 all steel box cars of 50 tons' capacity; American Car & Foundry Company, 1,500 all steel box cars of 50 tons' capacity, and the Pressed Steel Car Company, 500 cars of 70 tons' capacity.

THE SOUTHERN RAILWAY, reported in the *Railway Age* of February 17 as inquiring for 4,200 cars, has ordered 1,365 composite hopper cars and 1,500 box cars from the American Car & Foundry Company; 1,500 composite hopper cars and 1,000 box cars from the Standard Steel Car Company; 570 box cars from the Mt. Vernon Car Manufacturing Company. All the box cars are 36 ft. long. An order has also been given for 200 stock cars to the Kilby Car & Foundry Company.

## Passenger Cars

THE SOUTHERN RAILWAY, reported in the *Railway Age* of February 17 as inquiring for five dining cars, has ordered this equipment from the Pullman Company.

THE NEW YORK CENTRAL has given an order for 10 milk cars to the Merchants' Dispatch Transportation Company. These cars are for use on the Rutland Railroad.

## Iron and Steel

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA has ordered 297 tons of structural steel for bridge renewals from the American Bridge Company.

THE UNION PACIFIC has ordered 400 tons of structural steel for a locomotive erecting and boiler shop at Los Angeles, Cal., from the McClintic-Marshall Company.

THE PERE MARQUETTE has ordered 2,243 tons of structural steel for the construction of shops at Grand Rapids, Mich., from the Whitehead & Kales Iron Works.

THE KENNEDY CAR LINER COMPANY has ordered 200 tons of structural steel for the construction of a plant at Shelbyville, Ind., from the Central State Bridge Company.

MITSUI & Co., New York, has given an order for 10,000 tons of rail to the United States Steel Products Company. These rails are for the Japanese Government Railways.

THE MINNEAPOLIS & ST. LOUIS has ordered 443 tons of structural steel for remodeling the approaches and repairs to the Fifth street, north bridge, Minneapolis, Minn., from the McClintic-Marshall Company.

THE ST. LOUIS-SAN FRANCISCO has ordered 18 deck plate girder spans aggregating 779 tons for a bridge across the Arkansas river at Tulsa, Okla., and 1,144 tons of through riveted and deck girder spans from the American Bridge Company.

## Machinery and Tools

THE WESTERN MARYLAND has ordered from Joseph T. Ryerson Son, Inc., a complete equipment for the repairing of locomotive flues.

THE CANADIAN NATIONAL RAILWAYS are inquiring for a large number of machine shop tools including upright drills, engine lathes, shapers, planers, turret lathes and boring machines and other tools.

## Signaling

THE BUFFALO, ROCHESTER & PITTSBURGH has placed a contract with the General Railway Signal Company, Rochester, N. Y., for an initial installation of their inductive method train control device on a 15-mile section of its Rochester division between Maplewood, N. Y., and P. & L. Jct.

THE PERE MARQUETTE plans to install automatic block signals on its line between Alexis, Ohio, and Carleton, Mich., 25 miles, double track.

THE MISSOURI, KANSAS & TEXAS has ordered from the Union Switch & Signal Company 20 automatic semaphores, to be installed in Hillsboro yards, together with a low voltage switch machine; also, four signals for Temple and nine for Granger. Of the latter, eight are color light signals, three-indication, style "L."

# Supply Trade News

R. **W. Williams,** who has been appointed southwestern district manager for both the Westinghouse Air Brake Company and the Westinghouse Traction Brake Company, with headquarters at St. Louis, Mo., and also was elected a vice-president of the American Brake Company, as was announced in our issue of March 3, has been connected with the Westinghouse Air Brake Company since April 1, 1902, when he went to Wilmerding as secretary to John F. Miller, now vice-chairman of the board of directors. Mr. Williams was born in Renovo, Pa., in 1878. He attended public school in Williamsport, Pa., and graduated from high school with the class of 1897. He immediately entered the employ of the Pennsylvania Railroad, serving in the freight and maintenance of way departments at Williamsport until he went to the Air Brake Company. After serving in the general offices at Wilmerding for seven years, he was transferred to the southeastern district office in Pittsburgh. In 1910 he went to the Cincinnati office, and two years later was appointed representative and assigned to the Atlanta office. He returned to the Pittsburgh office in September, 1920, where he has served up to the present time.

R. W. Williams

**B. L. Worden,** whose election to director and vice-president of the **Cutler-Hammer Manufacturing Company,** Milwaukee, Wis., was announced in the *Railway Age* of February 17, page 447, was born in Chicago on February 8, 1871. He was graduated from the University of Wisconsin in 1892, and immediately entered the employ of the Wisconsin Bridge & Iron Company, Milwaukee, Wis., where he was employed in various capacities until 1902. He resigned from the Wisconsin Bridge & Iron Company on that date to become associated with the Worden - Allen Company, Milwaukee. In 1912 he founded the Lackawanna Bridge Company, Buffalo, N. Y., but still retained the presidency of the Worden-Allen Company. A few years later he purchased the Ferguson Steel & Iron Corporation, Buffalo, N. Y. In 1917, Mr. Worden was in charge of the construction of the Submarine Boat Corporation's ship yards at Newark, N. J., and was in full charge of the plant during the period when 150 steel ships were constructed during the war. He is still connected with the Submarine Boat Corporation. In 1922 he became president of the Beaver Board Company and affiliated companies, and still holds that position.

B. L. Worden

**The Gibb Instrument Company,** Bay City, Mich., manufacturers of electric welding equipment, has opened a sales office in the General Motors building, Detroit, in charge of **F. M. Luchs,** formerly chief engineer for the company.

**C. O. Poor** has been elected managing director of the **P. & M. Company, Ltd.,** Montreal, with headquarters at 1002 McGill building.

The corporate name of the Fairmont Gas Engine & Railway Motor Car Company has been changed to **Fairmont Railway Motors, Inc.,** Fairmont, Minn.

**The Truscon Steel Company,** Youngstown, Ohio, will construct two additional factory buildings, one 80 ft. by 400 ft., and the other 80 ft. by 200 ft., at Youngstown.

**Wm. H. Schutte,** who has been identified for a long time with the Chicago selling force of the **Blaw-Knox Company,** Pittsburgh, Pa., has been promoted to the managership of its Chicago office.

**B. Olney Hough,** editor of the American Exporter, has relinquished that position to establish himself as an export counselor, consultant and adviser to banks, exporters and manufacturers, with offices at 17 Battery place, New York.

The **American Tool & Manufacturing Works,** Chicago, has been organized to design and manufacture special machinery, dies, jigs and fixtures and to manufacture screw machine and punch press products. **A. B. Cochrane,** formerly district sales manager of the Steel & Tube Company of America, with headquarters at Chicago, is president and **Robert Hofstetter,** formerly an engineer with the Illinois Tool Works, Chicago, and the Nash Motors Company of Kenosha, Wis., is manager. Mr. Cochrane was born on February 28, 1885, at Brooklyn, N. Y., and was educated at Ellsworth College, Pittsburgh. He was employed by the American Sheet & Tin Plate Company in various positions in the traffic manager's office at Pittsburgh until 1909, when he resigned to become assistant traffic manager of the Mark Manufacturing Company, with headquarters at Chicago. He was later promoted to traffic manager. On September 6, 1917, he enlisted in the United States Navy and was made chief petty officer in charge of transportation in the ninth, tenth and eleventh Naval districts and on August 8, 1918, was promoted to paymaster with rank of ensign. He was discharged from the navy on March 15, 1919, and returned to the Steel & Tube Company of America, formerly the Mark Manufacturing Company, as district sales manager, with headquarters at Chicago. In August, 1922 he resigned and on March 1, 1923, organized the American Tool & Manufacturing Works.

A. B. Cochrane

**C. C. Clabaugh,** gang foreman in the Collinwood, Ohio, shops of the New York Central, has been appointed inspector with the **Franklin Railway Supply Company, Inc.,** New York. Mr. Clabaugh is stationed at the plant of the Lima Locomotive Works, Lima, Ohio.

**A. H. Talbot** has opened an office at 237 Railway Exchange building, Chicago, under the firm name A. H. Talbot-Railway Equipment to deal in railway locomotives, cars and rails. A. M. Talbot, formerly secretary and treasurer of J. T. Gardner, Inc., Chicago, will be in charge.

**Broderick Haskell, Jr.,** has joined the service staff of the **Franklin Railway Supply Company, Inc.,** New York, as special engineer in connection with the locomotive booster. **A. F. Zinkan,** who had been for 22 years with the New York

Central, much of the time as inspector of locomotive construction, has joined the inspection department of the Franklin Railway Supply Company, Inc., and **C. G. Shafer,** road foreman of engines of the Southern Railway, is now a service engineer with the Franklin Railway Supply Company, Inc. Mr. Shafer's headquarters in his new position are at Memphis, Tenn.

Owing to the Cleveland Discount Company having gone into receivership the **Sharon Pressed Steel Company,** which was being financed by them, went into voluntary receivership on February 26, in the United States District Court, Pittsburgh. The court has authorized the operation of the plant under W. L. David and Donald Thompson, receivers, who have appointed **A. E. Swan,** former vice-president and general manager of the Sharon Pressed Steel Company, their agent and attorney. The Sharon company has been struggling under limited finances for some time past, due to heavy fixed charges being carried over from previous reorganizations. The plant has approximately three-quarters of a million dollars' worth of business on the books, first class, automobile and railroad accounts, which is considerably more than at any previous time of its career and now, with the court's authority to continue operation, its prospects are considerably brighter.

**Charles D. Jenks,** whose resignation as president and a director of the Damascus Brake Beam Company, Cleveland, Ohio, and appointment as a vice-president of the **Chicago-Cleveland Car Roofing Company,** with headquarters at Chicago, was announced in the *Railway Age* of March 3, was born in Philadelphia, Pa. He entered railroad service with the Pennsylvania Railroad, with which road he was employed in the freight and operating departments at Philadelphia for nine years. He then resigned to enter the employ of the Atlantic Refining Company, Philadelphia, in the engineering and construction department. In 1900, he became assistant to the vice-president of the Pressed Steel Car Company, with headquarters at Pittsburgh, Pa., and later was promoted to sales agent, with headquarters at Chicago, which position he held until 1910, when he was appointed western sales manager of the Standard Coupler Company, with headquarters at Chicago. From 1912 to January 31, 1918, he was general manager of Edwin S. Woods & Company and from the latter date until February 28, 1923, he was president and a director of the Damascus Brake Beam Company, Cleveland, Ohio. In June, 1922, he was elected vice-president of the Railway Supply Manufacturers' Association.

Charles D. Jenks

## Lima Locomotive Works, Incorporated

The net income of the Lima Locomotive Works, Inc., for the year ended December 31, 1922, was $175,446, as compared with $1,136,592 for 1921. Gross income in 1922 amounted to $6,476,953, against $12,528,154 in the previous year. During the year a credit was made to surplus account of $250,000 from unexpected reserves, but after deducting a premium on Lima Locomotive Corporation 6 per cent gold bonds retired, amounting to $123,076, and dividends on the preferred and common stocks of $320,196, the profit and loss surplus on December 31, 1922, was $2,453,167. This compares with $2,470,994 at the close of 1921.

Joel S. Coffin, chairman of the board of directors, in his report to the stockholders said in part:

"The volume of business done was adversely affected by the industrial depression prevailing during the greater part of the year and the consequent limited demand for locomotives.

"The balance sheet shows a reduction of $763,027 in goodwill, as compared with the amount on December 31, 1921, property account having been correspondingly increased on January 1, 1922, following an appraisal of the company's plant and property.

"The unfilled orders on the books at the close of the year amounted to $14,749,081, all for domestic railroads."

The balance sheet, as of December 31, 1922, follows:

ASSETS

| | | | |
|---|---|---|---|
| *Current Assets:* | | | |
| Cash on hand and in bank | | $1,615,629.47 | |
| Bills receivable | | 146,250.07 | |
| Accounts receivable | | 1,064,658.41 | |
| Inventories—Materials and supplies and work in progress | | 4,438,865.31 | |
| Employees' preferred stock subscription account | | 37,164.25 | |
| Accident insurance fund (cash and Government securities), (see contra) | | 94,465.28 | |
| Miscellaneous deferred charges to operations | | 359,854.46 | |
| | | | $7,756,887.25 |
| Property account—Land, buildings and equipment (less reserve for depreciation) | | | 4,876,431.87 |
| Drawings, patterns, dies, etc | | | 1.00 |
| Goodwill | | | 2,687,716.47 |
| | | | $15,321,036.59 |

LIABILITIES

| | | | |
|---|---|---|---|
| *Current Liabilities:* | | | |
| Bills payable (banks) | | $1,000,000.00 | |
| Accounts payable | | 1,070,831.84 | |
| Miscellaneous accrued liabilities | | 122,425.27 | |
| Reserve for federal income taxes (1921) | | 27,296.71 | |
| Accident insurance reserve (see contra) | | 94,465.28 | |
| | | | $2,315,019.10 |
| *Capital Stock:* | | | |
| Preferred stock, $100 par value, shares authorized | 23,411 | | |
| Less shares unissued | 3,978 | | |
| Shares outstanding | 19,433 | $1,943,300.00 | |
| Common stock, without par value, shares authorized | 300,000 | | |
| Less shares unissued | 128,307 | | |
| Shares outstanding | 171,693 | 8,584,650.00 | |
| Common stock, $100 par value, shares outstanding* | 249 | 24,900.00 | |
| | | | 10,552,850.00 |
| Surplus December 31, 1922 | | | 2,453,167.49 |
| | | | $15,321,036.59 |

*In course of being exchanged for common stock without par value.

## Interstate Iron & Steel Company

The annual report of the Interstate Iron & Steel Company, Chicago, shows the company earned $231,574 on the common stock in 1922, compared with a net loss of $344,723 on the common stock in 1921. The reserves were increased from $70,940 in 1921 to $92,311 in 1922.

The income account for 1922 and the balance sheet as of December 31, 1922, are as follows:

INCOME ACCOUNT

| | 1922 | 1921 |
|---|---|---|
| Earnings after expenditures | $1,083,304 | $495,843 |
| Reserve for depreciation | 381,454 | 158,976 |
| Reserve for taxes | 92,311 | 70,940 |
| Discount and expenses on bond issues written off | 35,423 | 16,716 |
| Bond interest | 320,000 | 216,425 |
| Other interest paid (less received) | 22,541 | 42,311 |
| Net income | 231,574 | 9,526 |
| Adjustment of inventories | ..... | 284,764 |
| Loss on Liberty bonds sold | ..... | 50,433 |
| Surplus | 231,574 | *344,723 |

* Deficit. Earned on common, 2.18 per cent.

BALANCE SHEET

| Assets | 1922 | 1921 |
|---|---|---|
| Plant and equipment | $10,213,104 | $10,307,760 |
| Cash | 264,280 | 324,665 |
| Investments | 42,201 | 37,500 |
| Accounts receivable | 1,351,183 | 557,745 |
| Inventory | 3,371,285 | 2,086,610 |
| Deficit charges | 462,067 | 496,488 |
| | $15,704,122 | $13,810,768 |
| **Liabilities** | | |
| Preferred stock | $2,060,000 | $2,060,200 |
| Common stock | 4,000,000 | 4,000,000 |
| Funded debt | 4,000,000 | 4,000,000 |
| Bad debt reserve | 25,000 | 20,010 |
| Repairs and renewals | 41,200 | 37,074 |
| Contingencies | 300,000 | 300,000 |
| Bills payable | 900,000 | 600,000 |
| Accounts payable | 1,787,652 | 448,675 |
| Accidents | 24,068 | 21,528 |
| Taxes and interest | 127,817 | 116,671 |
| Preferred sinking fund | 307,170 | 307,170 |
| Surplus | 2,131,104 | 1,899,440 |
| | $15,704,122 | $13,810,768 |

## Obituary

**R. E. Janney,** consulting engineer of the coupler department of the American Steel Foundries, Chicago, died on March 2 in Chicago.

**A. S. Littlefield,** western sales agent of the Loraine Steel Company, with headquarters at Chicago, died on March 4 from heart trouble at his home in Chicago.

**Columbus K. Lassiter,** president of the Consolidated Machine Tool Corporation of America, New York City, and formerly vice-president in charge of manufacturing of the American Locomotive Company, died from a sudden heart attack while driving his automobile in New York City on March 3. He had served also the Bausch Machine Tool Company, Springfield, Mass., as a controller, and was a director of many other corporations. Mr. Lassiter was born in Suffolk, Va., and was 57 years of age at the time of his death. He served with the American Locomotive Company for 29 years at Richmond, Schenectady and New York. His first position with this company was that of timekeeper at Richmond and he was promoted until he became general mechanical superintendent. About nine years ago he was elected vice-president in charge of all manufacturing, from which position he resigned on July 1, 1922, to become president of the Consolidated Machine Tool Corporation of America which he was instrumental in organizing. He served as president of the Consolidated Machine Tool Corporation up to the time of his death. Mr. Lassiter was the patentee of a number of machine tool and railroad appliances, chief of which was staybolt machinery now in general use in most of the railroad shops in this country.

Columbus K. Lassiter

## Trade Publications

YARD LIGHTING.—Ivanhoe Lighting Equipment for Railroad Service is the title of a 15-page illustrated catalogue issued by the Ivanhoe-Regent Works of the General Electric Company, Cleveland, Ohio. The catalogue includes recommendations for lighting a typical classification yard and describes and illustrates various types of lighting units for this class of service.

OXY-ACETYLENE OUTFITS.—The Air Reduction Sales Company has issued two booklets describing and illustrating its line of oxy-acetylene welding and cutting apparatus and equipment, together with its tube welding machines and acetylene generators. The bulletins devote some attention to the history of these subjects, and the use of equipment, and designate the field for which each type of apparatus listed is especially adapted.

COALING AND CINDER PLANTS.—A bulletin has been issued by the Roberts & Schaefer Company describing a one-man operated plant which this company has recently developed to perform the duel functions of coaling locomotives and handling cinders. The bulletin is illustrated with line drawings and photographs showing the plant in elevation and plan, as well as sectional views illustrating its general appearance and operation.

COMBUSCO ASH CONVEYOR.—The Combustion Engineering Corporation, New York, has issued a large size, 12-page, illustrated booklet descriptive of a new type of ash conveyor for power plant and other uses. The text describes the various phases of its operation such as the automatic removal of ashes, the prevention of dust and fumes, the quenching, the maintenance of an air seal in the combustion chamber, etc., while the photographs illustrate numerous sections of typical installations.

## Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company will construct a line from El Segundo, Cal., to Wilmington, a distance of approximately 20 miles. Contracts for the grading and for the construction of bridges will be let about April 1. Six small bridges and two station buildings will be constructed.

BUFFALO, ROCHESTER & PITTSBURGH.—This company has awarded a contract to the Miller Construction Company, Lock Haven, Pa., for the grading necessary for a 2-mile extension to its Jacksonville branch.

CANADIAN NATIONAL.—This company has authorized the completion of the branch line from Kamloops, B. C., to Kelowna, the work on which was stopped during the war.

CHESAPEAKE & OHIO.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the extension of a branch line up Gauley river, 10.6 miles from Bryce, W. Va.

CHESAPEAKE & OHIO.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of an addition to the store house at Huntington, W. Va., to cost approximately $80,000.

CHICAGO, BURLINGTON & QUINCY.—This company contemplates the construction of a 60-mile line from Sheridan, Wyo., northward into the coal fields of Southeastern Montana.

ILLINOIS CENTRAL.—This company contemplates the construction of a brick and steel car repair shop and other additions to the shop facilities of the Burnside shops at Chicago to cost approximately $3,000,000. This company is calling for bids for the reduction of grade on the main line near Paxton, Ill., reported in the *Railway Age* of January 20. This company will also close bids on March 12 for the alterations to the passenger station at Morganfield, Ky., as reported in the *Railway Age* of February 17.

KANSAS CITY SOUTHERN.—This company contemplates the construction of an addition to the grain elevator at Port Arthur, Tex., which will increase its capacity by 600,000 bushels.

MISSOURI PACIFIC.—This company has awarded a contract to the Massman Construction Company, Kansas City, Mo., for the construction of a 1,000 ft. revetment on the Missouri river near Levasy, Mo., and a rock toe wall and bank paving along the Big Blue river at Dodson, Mo.

MISSOURI PACIFIC.—This company is calling for bids for the construction of a 2,000,000 bu. reinforced concrete grain elevator at St. Louis, Mo., to cost approximately $2,000,000.

SOUTHERN PACIFIC.—This company contemplates the construction of a new passenger station at Sacramento, Cal.

SOUTHERN PACIFIC.—This company plans the construction of a new line 13 miles long from Magunden, Kern County, Cal., to Arvin.

SOUTHERN PACIFIC.—This company plans the construction of approximately 43 miles of second track on the lines of the Central Pacific in California and Nevada.

ST. LOUIS-SAN FRANCISCO.—This company plans the construction of new shop buildings at St. Louis, Mo., and at East Thomas, Ala. Each group will be of concrete, brick and steel construction and will consist of a roundhouse, machine shop, power house, mill shop, car repair shop and storeroom. The cost of the new facilities will be approximately $500,000 at each place.

UTAH CENTRAL.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a new line extending from coal mines in Huntington Canyon to Healy, Utah, on the Utah Railway, 21 miles, with an additional branch line.

WESTERN PACIFIC.—This company contemplates the construction of a new yard and related facilities at Stockton, Cal.

# Railway Financial News

ALABAMA GREAT SOUTHERN.—*Equipment Trusts Sold.*—J. P. Morgan & Co. have sold at prices to yield 5.20 per cent $2,850,000 5 per cent equipment trust gold certificates, series "G."

CANADIAN PACIFIC.—*Earnings in January.*—For the sixth month in succession this road shows gross and net earnings at an increase as compared with the corresponding month of a year previous. The net earnings and expenses for January, 1923, are the greatest shown for January since 1919. Gross earnings for January of this year were $13,148,194, as compared with $11,337,974 for January, 1922. Working expenses amounted to $12,428,887, as compared with $10,854,497. This left net earnings at $720,026, as compared with $483,477 in January, 1922.

CHESAPEAKE & OHIO.—*Stock Sold.*—A syndicate, headed by Dominick & Dominick, has sold a block of 12,000 shares of 6½ per cent cumulative convertible preferred stock, series A, at a price to yield about 6.25 per cent.

CHICAGO, ROCK ISLAND & PACIFIC.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,000,000 of general mortgage gold bonds, to reimburse the treasury for expenditures, and to be pledged as collateral for an issue of $1,000,000 of first and refunding mortgage gold bonds.

FRUIT GROWERS' EXPRESS COMPANY.—*Equipment Trusts Offered.*—The First National Bank of New York and the National City Company are offering at prices to yield from 5 to 5.20 per cent, according to maturity, $2,000,000 5 per cent equipment trust certificates, series B, due serially from 1924 to 1938. The proceeds are to meet part of the cost of 1,080 new steel underframe refrigerator cars which the company is building in its own shops at a cost of approximately $2,400,000.

MOBILE & OHIO.—*Equipment Bonds Authorized.*—The Interstate Commerce Commission has authorized an issue of $1,600,000 of equipment bonds to be sold at not less than 98.

PITTSBURGH, YOUNGSTOWN & ASHTABULA.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $3,789,000 of first general mortgage 5 per cent bonds to be guaranteed by the Pennsylvania and to be delivered to it in part payment for additions and betterments made between 1917 and 1921.

SOUTHERN RAILWAY.—*Equipment Trusts Sold.*—Drexel & Co., of Philadelphia, have sold at prices to yield 5 per cent to 5.25 per cent, $6,750,000 5 per cent equipment trust certificates, series "X."

## Treasury Payments to Railroads

Since last announcement, dated February 1, 1923, payments under Sections 204, 209, 210 and 212 of the Transportation Act, 1920, as amended, have been made by the Treasury as follows:

| | |
|---|---|
| Section 204: | |
| Colfax Northern | $8,025 |
| Lake Tahoe Railway & Transportation Co. | 24,081 |
| Mississippi River & Bonne Terre | 175,910 |
| Rowlesburg & Southern | 7,738 |
| Tonopah & Goldfield | 253,441 |
| White Sulphur & Huntersville | 770 |
| Section 209: | |
| Alabama Northern | 3,197 |
| Atlantic & Western | 4,339 |
| Chicago, Rock Island & Pacific | 725,578 |
| Green Bay & Western | 141,811 |
| Illinois Northern | 55,308 |
| Mount Jewett, Kinzua & Riterville | 9,221 |
| Ray & Gila Valley | 111,057 |
| Sharpsville Railroad, Receiver | 20,374 |
| St. Joseph Belt Railway | 8,027 |
| Wheeling & Lake Erie | 871,069 |
| Winfield Railroad | 16,011 |
| Wood River Branch | 2,372 |
| Maxton Alma & Southbound | 4,406 |
| Moshassuck Valley | 19,207 |
| Louisville & Nashville | 2,181,062 |
| Section 210: | |
| New York, New Haven & Hartford | 2,200,000 |
| Section 212: | |
| Charlotte, Monroe & Columbia | 7,000 |
| Chesterfield & Lancaster | 18,000 |
| Chicago Great Western | 125,000 |
| East & West Coast | 17,000 |
| Florida Central & Gulf | 24,000 |
| Macon, Dublin & Savannah | 40,000 |
| Raleigh & Charleston | 18,000 |
| Tampa & Gulf Coast | 97,500 |
| Tampa Northern | 25,000 |
| Total | $7,214,504 |
| Total payments to February 28, 1923: | |
| (a) Under Section 204, as amended by Section 212 for reimbursement of deficits during Federal Control: | |
| (1) Final payments, including partial payments previously made | $5,274,601 |
| (2) Partial payments to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission | 978,438 |
| Total payments, account reimbursement of deficits | 6,253,039 |
| (b) Under Section 209, as amended by Section 212 for guaranty in respect to railway operating income for first six months after Federal control: | |
| (1) Final payments, inccluding advances and partial payments previously made | $139,963,784 |
| (2) Advances to carriers as to which a certificate for final payments has not been received by the Treasury from the Interstate Commerce Commission. | 204,578,922 |
| (3) Partial payments to carriers as to which a certificate for final payment has not been received, as stated above | 113,012,422 |
| Total payments, account of said guaranty | 457,555,129 |
| (c) Under Section 210 for loans from the revolving fund of $300,000,000 therein provided | 331,228,667 |
| Total | $795,036,835 |

Repayments on loans under Section 210 have been made to the amount of $141,013,498.

The carriers which have paid into the Treasury excess earnings during the guaranty period pursuant to the provisions of Section 209 (d) of the Transportation Act, 1920, as amended, and the amounts severally paid by them to the United States are as follows:

| | |
|---|---|
| Annapee & Western | $2,940 |
| Kewaunee, Green Bay & Western | 261 |
| Lake Tahoe Railway & Transportation Co. | 5,004 |
| Total | $8,205 |

## Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out and received from the several roads the following amounts:

| | |
|---|---|
| Rutland Railroad Company | $350,000 |
| Joplin Union Depot Company | 18,000 |
| Indiana Harbor Belt Railroad Company paid Director General | 495,000 |
| Short Lines | |
| South San Francisco Belt Railway Co. | $5,500 |
| Nacogdoches & Southeastern Railroad Co. | 3,000 |
| Little Rock, Maumelle & Western Railroad Co. | 8,000 |
| Wyandotte Southern Railroad Company | 1,700 |
| Rowlesburg & Southern Railroad Co. | 2,000 |

## Dividends Declared

Beech Creek—50 cents, quarterly, payable April 2 to holders of record March 15.

Northern Pacific—$1.25, quarterly, payable May 1 to holders of record March 16.

Pittsburgh & West Virginia—Preferred, 1½ per cent, quarterly, payable May 31 to holders of record May 9.

Pittsburgh, Ft. Wayne & Chicago—Common, 1¾ per cent, quarterly, preferred, 1¾ per cent, quarterly; both payable April 2 to holders of record March 10.

St. Louis, Rocky Mountain & Pacific—Common, 1 per cent, quarterly; preferred, 1¼ per cent, quarterly; both payable March 31 to holders of record March 17.

Southern Railway (Mobile & Ohio Certificates)—$2.00, semi-annually, payable April 1 to holders of record, March 15.

Western Pacific—Preferred, $1.50, quarterly, payable April 2 to holders of record March 21.

## Trend of Railway Stock and Bond Prices

| | Mar. 6 | Last Week | Last Year |
|---|---|---|---|
| Average price of 20 representative railway stocks | 69.41 | 68.81 | 59.66 |
| Average price of 20 representative railway bonds | 84.05 | 84.29 | 82.31 |

# Railway Officers

## Executive

**C. J. Ingersoll** has been appointed assistant to the president of the Midland Valley, with headquarters at Muskogee, Okla.

**J. Hainen,** assistant to the vice-president, mechanical, of the Southern, with headquarters at Washington, D. C., has resigned.

**Major Graham A. Bell** has been appointed vice-president in charge of finance of the Canadian National. Major Bell was born on August 13, 1874, at Perth, Ont., and was educated in the public schools and the Collegiate Institute of that city. In 1893 he entered the service of the Department of Railways and Canals and in 1908 was advanced to the position of financial comptroller of the department. From 1915 to 1917 he was in military service and in the latter year was appointed assistant to the railways minister in the Canadian government. In 1918 he was appointed acting deputy minister and, in 1919, deputy minister, which position he held at the time of his recent appointment. In 1917 Major Bell was appointed a director of the Canadian Northern representing the Canadian government and in 1922 he was similarly appointed a director of the Grand Trunk.

Major G. A. Bell

**Gerard Ruel** has been appointed vice-president and general counsel of the Canadian National. Mr. Ruel was born on July 5, 1866, at St. John, N. B., and was educated at Harvard University from which institution he was graduated in 1889 with the degree of LL.B. He entered railway service in 1891 with the Intercolonial at St. John, as an accountant. He later served as secretary-treasurer, passenger agent and general passenger and ticket agent at the same point. In 1899 he became a law clerk for the Canadian Department of Railways and Canals. In 1903 he was appointed assistant solicitor for the Canadian Northern at Toronto. Two years later he was promoted to chief solicitor. In 1918 he was appointed counsel of the Canadian National and, in 1920, was advanced to general counsel, which position he held until the time of his recent promotion.

G. Ruel

**C. E. Denney,** vice-president and general manager of the New York, Chicago & St. Louis and vice-president of the Lake Erie & Western, has also assumed the duties of general manager of the latter road, with headquarters at Cleveland, Ohio. This change has been made following the resignation of L. S. Emery, general manager, to accept service with the New York Central.

**M. H. MacLeod,** vice-president in charge of construction of the Canadian National, has at his own request relinquished that position and has been appointed consulting officer to the executive.

**A. J. Hills,** assistant to the president of the Canadian National with headquarters at Montreal, has been appointed assistant to the vice-president in charge of the operating and construction departments with the same headquarters.

**R. C. Watkins,** who has been engaged in special work for the president's office of the Southern Pacific, has been appointed vice-president and general manager of the Southern Pacific, Louisiana Lines, with headquarters at New Orleans, La., succeeding J. H. R. Parsons, who has been appointed assistant passenger traffic manager.

**F. P. Gutelius,** vice-president of the Delaware & Hudson, has been appointed resident vice-president at Montreal succeeding C. S. Sims, resigned. **J. T. Loree,** general manager, has been appointed vice-president and general manager in charge of the operating and traffic departments with headquarters at Albany, N. Y., succeeding Mr. Gutelius.

**J. E. Dalrymple,** vice-president of the Grand Trunk, has been appointed vice-president in charge of traffic of the Canadian National with headquarters at Montreal. Mr. Dalrymple was born at Montreal fifty-four years ago. He had his first railroad experience in the treasurer's office of the Grand Trunk in that city, and has since occupied the positions of secretary to the traffic manager of the Chicago & Grand Trunk; secretary to the general traffic manager of the Grand Trunk; division freight agent at Hamilton, Ont., and Detroit, Mich.; manager of the Grand Trunk Despatch lines; general freight agent of the Central Vermont Railway; assistant to the vice-president and general manager; general freight agent of the Grand Trunk; assistant freight traffic manager of the Grand Trunk Pacific. In 1911 he was appointed to the office of vice-president in charge of traffic of the Grand Trunk System, and he has been a vice-president of the road since that time.

J. E. Dalrymple

## Financial, Legal and Accounting

**M. L. Bluhm** has been appointed assistant general solicitor of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago.

**J. E. Ryan** has been appointed auditor of the Illinois Northern, the Chicago, West Pullman & Southern, the Deering Southwestern and the Owasco River.

The following appointments have been made in the legal department of the Canadian National: **W. C. Chisholm,** assistant general counsel, Montreal; **E. E. Fairweather,** assistant general counsel, Montreal; **Alistair Fraser,** commission counsel, Montreal; **H. F. Alward,** regional counsel, Atlantic Region, Moncton; **T. J. Allen,** solicitor, Atlantic region, Moncton; **A. J. Reid,** regional counsel, Central region, Toronto; **J. P. Pratt,** assistant regional counsel, Central region, Toronto; **E. S. Fraser,** solicitor, Central region, Toronto; **A. E. Beckett,** solicitor, Central region, Montreal; **C. A. Harwood,** solicitor, Central region, Montreal; **T. Waterson,** solicitor, Montreal; **R. H. M. Temple,** regional counsel, Western region, Winnipeg; **R. W. Hannington,** assistant regional counsel, Western region, Vancouver; **G. M. Hair, D. O. Owens,**

**G. M. Russell** and **J. R. Black,** solicitors, Western region, Winnipeg; **A. R. McLeod,** solicitor, Western region, Vancouver.

**James A. Yates,** treasurer of the Grand Trunk, has been appointed general treasurer of the Canadian National. Mr. Yates was born on November 30, 1876, at Montreal. He received a public school education and entered railway service on June 1, 1891, as a clerk for the Grand Trunk. In 1907 he was promoted to chief clerk in the treasury department of the Grand Trunk Pacific. On August 1, 1914, he was advanced to the position of assistant treasurer of the Grand Trunk and held that position until September 1, 1922, when he was promoted to treasurer. In this position he was serving at the time of his appointment, on February 15 of the current year, as general treasurer of the Canadian National with headquarters at Montreal, Quebec.

James A. Yates

## Operating

**D. B. Mulligan** has been appointed general manager of the hotels of the Canadian National with headquarters at Winnipeg.

**W. Pratt** has been appointed general manager of sleeping, dining and parlor cars and railway restaurants of the Canadian National with headquarters at Montreal.

**G. R. Carson** has been appointed superintendent of terminals of the St. Louis-San Francisco with headquarters at Birmingham, Ala., succeeding E. M. Mohler, resigned.

**L. S. Brown,** assistant general manager of the Canadian National with headquarters at Montreal, has been appointed general manager of the Atlantic region with headquarters at Moncton, N. B.

**Capt. C. H. Nicholson** has been appointed manager of the Canada Atlantic Transit Company and the Lake Michigan, Detroit river and Lake Ontario car ferries of the Canadian National with headquarters at Toronto.

**F. L. Wood,** assistant to the vice-president and general manager of the Pullman Company, with headquarters at Chicago, has been promoted to assistant general manager, with headquarters at San Francisco, Cal.

**C. G. Bowker,** operating manager of the Grand Trunk lines east of the Detroit and St. Clair rivers, has been appointed general manager of the Central region of the Canadian National with headquarters at Toronto, Ont.

**O. Pierce** has been appointed acting superintendent of the Ft. Wayne division of the New York, Chicago & St. Louis, with headquarters at Ft. Wayne, Ind., succeeding **W. F. Waterson,** who has been granted a leave of absence.

**D. Y. Geddes,** superintendent of the St. Louis division of the Pennsylvania, with headquarters at Terre Haute, Ind., has had his jurisdiction extended over the Peoria division as a result of the consolidation of the St. Louis and Peoria divisions.

**T. J. Maloney** has been appointed vice-president and general manager of the Illinois Northern and general manager of the Chicago, West Pullman & Southern, the Deering Southwestern and the Owasco River, to succeed A. G. Huckin, deceased.

**J. T. Colbert,** general superintendent of the Pittsburgh & Shawmut with headquarters at Kittanning, Pa., will have charge of the operation of the property reporting directly to the president, Dwight C. Morgan, vice-president and general manager, having resigned.

**A. E. Warren,** general manager of the western lines of the Canadian National with headquarters at Winnipeg, Man., has been appointed general manager of the Western region of the same company in the reorganization occasioned by consolidation with the Grand Trunk.

**Charles Manning,** assistant operating manager of the Grand Trunk lines east of the Detroit and St. Clair rivers, has been appointed assistant to the vice-president in charge of insurance, lands, express, telegraphs, colonization, developments and general matters of the Canadian National with headquarters at Montreal.

**C. S. Branch,** superintendent in charge of the transportation and mechanical departments of the Chicago, Peoria & St. Louis, with headquarters at Springfield, Ill., has resigned to accept service with another company and the position of superintendent in charge of the transportation and mechanical department has now been abolished.

**D. Crombie,** transportation assistant of the Canadian National with headquarters at Toronto, has been appointed chief of transportation with headquarters at Montreal. **C. B. Brown,** engineering assistant with headquarters at Toronto, has been appointed chief engineer of the operating department with headquarters at Montreal.

**L. S. Emery,** general manager of the Lake Erie & Western, with headquarters at Indianapolis, Ind., has been appointed general manager of the Toledo & Ohio Central lines of the New York Central, with headquarters at Columbus, Ohio, succeeding **H. E. Speaks,** who has been appointed general superintendent, with the same headquarters.

**R. W. Simpson,** assistant to the general superintendent of the Canadian National with headquarters at Moncton, N. B., has been appointed assistant to the general manager of the Atlantic region with the same headquarters. **W. U. Appleton,** general superintendent of rolling stock, has been appointed general superintendent of the same region with headquarters at Moncton. **W. N. Rippey,** superintendent of transportation at Moncton, has been appointed superintendent of the Moncton division. **A. C. Barker** has been appointed superintendent of transportation of the Atlantic region.

**J. E. Morazain,** general superintendent of the Canadian National with headquarters at Quebec, has been appointed general superintendent of the Quebec district of the Central region with the same headquarters. **W. R. Davidson,** general superintendent of the Grand Trunk, lines east of the Detroit and St. Clair rivers with headquarters at Montreal, has been appointed general superintendent of the Montreal district in the Central region of the Canadian National with the same headquarters. **W. R. Devenish,** general superintendent of the Canadian National with headquarters at Toronto, has been appointed general superintendent of the Northern Ontario district of the Central region with the same headquarters. **R. H. Fish,** general superintendent of the Grand Trunk with headquarters at Toronto, has been appointed general superintendent of the Southwestern Ontario district of the Canadian National with the same headquarters. **H. E. Whittenberger,** general manager of the Grand Trunk, lines west of the Detroit and St. Clair rivers, has been appointed manager of the Michigan district of the Central region of the Canadian National with headquarters at Detroit.

## Traffic

**L. M. Souders** has been appointed general agent of the New York Central, with headquarters at Cleveland, Ohio.

**J. R. Bishop** has been appointed district passenger agent of the El Paso & Southwestern, with headquarters at Los Angeles, Cal.

**F. L. Taylor** has been appointed assistant agricultural agent of the Chicago, Burlington & Quincy, Lines West, and the Colorado & Southern, with headquarters at Denver, Colo.

**W. A. Lalor,** general passenger agent of the Chicago, Burlington & Quincy, with headquarters at St. Louis, Mo., resigned from active service on March 1 on account of ill health.

**G. F. Diekroeger** has been appointed district freight agent of the Canadian Pacific and the Minneapolis, St. Paul & Sault Ste. Marie with headquarters at St. Louis, Mo., succeeding W. M. Porteous, retired.

**Robert McDowell,** general agent for the Southern Pacific, with headquarters at Cleveland, Ohio, has been transferred to Cincinnati, Ohio, succeeding **H. F. Kern,** who has been granted leave of absence on account of ill health. **E. G. Cook,** chief clerk to the general agent at Cincinnati, has been promoted to general agent at Cleveland, succeeding Mr. McDowell.

**R. G. Merrick,** general freight agent of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., has assumed the duties of assistant freight traffic manager, the position formerly held by J. R. Koontz, who resigned to accept a vice-presidency of the St. Louis-San Francisco, as reported in the *Railway Age* of February 17.

## Mechanical

**C. S. Branch,** superintendent in charge of operation of the Chicago, Peoria & St. Louis, with headquarters at Springfield, Ill., has been appointed master mechanic of the Chicago & Alton with headquarters at Bloomington, Ill., succeeding W. H. Kerchner, who has resigned.

**C. E. Brooks,** mechanical assistant in the locomotive department of the Canadian National, has been appointed chief of motive power with headquarters at Montreal. **G. E. Smart,** mechanical assistant in the car department, has been appointed chief of car equipment with the same headquarters.

**W. E. Barnes,** master mechanic of the Canadian National at Moncton, N. B., has been appointed superintendent of motive power of the Atlantic region with the same headquarters. **G. E. McCoy,** master car builder with headquarters at Moncton, N. B., has been appointed superintendent of car equipment of the Atlantic region with the same headquarters.

**W. G. Black,** master mechanic of the New York, Chicago & St. Louis, with headquarters at Chicago, has been promoted to superintendent of motive power, with headquarters at Cleveland, Ohio, succeeding A. R. Ayers, whose promotion to assistant general manager was reported previously. **T. C. Baldwin,** superintendent of shops at Conneaut, Ohio, has been promoted to master mechanic, with headquarters at Chicago, succeeding Mr. Black.

**J. Coleman,** assistant to the general superintendent of the motive power and car departments of the Grand Trunk lines east of the Detroit and St. Clair rivers, with headquarters at Montreal, has been appointed general superintendent of the car department of the Canadian National, Central region, with headquarters at Toronto. **J. C. Garden,** general superintendent of motive power and car department of the Grand Trunk with headquarters at Montreal, has been appointed general superintendent of motive power of the Central region of the Canadian National with headquarters at Toronto.

**A. G. Akans,** road foreman of engines of the Southern with headquarters at Sheffield, Ala., has been transferred to Knoxville, Tenn., succeeding **G. G. Shafer,** who has resigned. **J. P. Russell,** road foreman of engines, with headquarters at Birmingham, Ala., has been transferred to Sheffield, succeeding Mr. Akans. **J. Sims,** road foreman of engines between Birmingham, Ala., and Columbus, Miss., with headquarters at Birmingham, has been transferred to the district between Birmingham and Atlanta, with the same headquarters. **J. E. Hardy** has been promoted to road foreman of engines, with headquarters at Birmingham, Ala., succeeding Mr. Sims.

**E. M. Sweetman,** superintendent of motive power, lines west of the Southern with headquarters at Cincinnati, O., has been transferred in a similar capacity to the lines east with headquarters at Charlotte, N. C., succeeding W. F. Kaderly, resigned. **Frank Johnson,** master mechanic at Ferguson, Ky., has been promoted to superintendent of motive power, lines west, succeeding Mr. Sweetman. **J. A. Wilking,** master mechanic at Chattanooga, Tenn., has succeeded Mr. Johnson as master mechanic at Ferguson and **L. C. Schults,** general foreman at Danville, Ky., has been promoted to master mechanic at Chattanooga. **J. J. Robinson,** master mechanic at Alexandria, Va., and **M. D. Stewart,** master mechanic at Bristol, Va., have changed places.

**C. F. Needham,** assistant to the general superintendent of the motive power and car departments of the Grand Trunk, lines east of the Detroit and St. Clair rivers, has been appointed assistant to the general manager of the Central region of the Canadian National with headquarters at Toronto, Ont. **W. A. Kingsland,** general manager of the Canadian National with headquarters at Montreal, has been appointed assistant general manager of the Central region with headquarters at Toronto. **C. R. Moore,** general superintendent of car service with headquarters at Montreal, has been appointed general superintendent of transportation of the Central region with headquarters at Toronto. **G. C. Jones** has been appointed assistant general manager of the Central region with headquarters at Montreal.

## Purchasing and Stores

**R. C. Vaughan,** whose appointment as director of purchases and stores of the Canadian National with headquarters at Montreal was announced in the *Railway Age* of March 3, page 544, was born on December 1, 1883, at Toronto, Ont. He received a high school education and entered railway service in 1898 with the Canadian Pacific. He later left this company to go with the Grand Trunk. From 1903 to 1910 he was with various predecessors of the Canadian National in various departments. From 1910 to 1918 he was assistant to the third vice-president of the Canadian Northern. From 1918 to December, 1920, he was assistant to the president of the Canadian National. From the latter date until the time of his recent appointment he served as vice-president of purchases and stores.

R. C. Vaughan

## Engineering, Maintenance of Way and Signaling

**J. C. Bland,** engineer of bridges and buildings of the Pennsylvania, with headquarters at Pittsburgh, Pa., has retired from active service, having reached the age for retirement.

**F. L. C. Bond,** chief engineer of the Grand Trunk, lines east of the Detroit and St. Clair rivers, has been appointed regional chief engineer of the Canadian National with headquarters at Toronto.

**C. S. Gzowski,** assistant to the vice-president in charge of construction of the Canadian National, has been appointed chief engineer of the construction department with headquarters at Montreal.

**H. Rindal,** district engineer of the British Columbia district of the Canadian Pacific, with headquarters at Vancouver, B. C., has been transferred to the Alberta district, with headquarters at Calgary, Alta.

**A. W. Duke,** supervisor of the Pennsylvania, with headquarters at North Philadelphia, Pa., has been promoted to

division engineer of the Logansport division with headquarters at Logansport, Ind., succeeding G. R. Barry, whose promotion to superintendent of the Richmond division was reported in the *Railway Age* of March 3.

The following appointments have been made in the engineering department of the Central region of the Canadian National, all with headquarters at Toronto, Ont.: **H. T. Hazen,** assistant chief engineer; **G. P. MacLaren,** engineer maintenance of way; **H. B. Stuart,** bridge engineer; **C. P. Disney,** assistant bridge engineer; **C. H. Tillett,** signal engineer; and **A. Crumpton,** valuation engineer.

**E. B. Fithian,** whose promotion to district engineer of the Missouri Pacific with headquarters at Kansas City, Mo., was reported in the *Railway Age* of February 3, was born on February 4, 1872, at Greenwich, N. J. He graduated from Rutgers College in 1896 and entered the service of the Pennsylvania on September 1 of that year in the engineering department of the New York division. He was promoted to assistant to the division engineer in September, 1899, and was again promoted to office engineer, with headquarters at Altoona, Pa., in January, 1900. He was promoted to assistant supervisor in April, 1900, and served in this capacity until August, 1903, when he entered the service of the Baltimore & Ohio, as maintenance of way inspector. He was promoted to assistant division engineer on January 1, 1904, and to division engineer in January, 1906. He entered the service of the Missouri Pacific in October, 1908, as division engineer of the Central division and was later transferred successively to the Arkansas and the Missouri divisions. He was division engineer at Poplar Bluff, Mo., on February 1, 1923, when he was promoted to district engineer, with headquarters at Kansas City, Mo.

### Special

**Dr. J. P. Mitchell** has been appointed assistant chief medical officer of the Canadian National with headquarters at Toronto.

**Dr. Alex Hutchison, C. B. E.,** has been appointed chief medical officer of the Canadian National with headquarters at Montreal.

## Obituary

**William McNab,** chairman of the valuation committee of the Grand Trunk and past president of the American Railway Engineering Association, died at Montreal, Que., on February 23, after an illness of about six weeks. Mr. McNab was born on January 14, 1855, at Irvine, Ayrshire, Scotland. He was educated at McGill Model School, Montreal, Que., and Montreal Collegiate Institute. He entered railway service in 1870 as an indentured pupil in the engineering department of the Grand Trunk. Until 1875 he was engaged with the then chief engineer on the work of constructing the international bridge across the Niagara River and various other construction projects. From 1875 to 1885 he acted as engineer of surveys and levels on revision work and as engineer of construction on double tracking and the construction of terminals. From 1886 to 1896 he had charge of general engineering work and maintenance of way. From the latter date to 1907, he superintended the drafting room and assisted the chief engineer on various new works. From 1907 to 1917 he served as principal engineer of the system. In the latter year he was appointed valuation engineer and in 1918 was named also chairman of the valuation committee. In this position he was serving at the time of his death. Mr. McNab was president of the American Railway Engineering Association in 1908-1909 and had been a director of the association since 1905.

William McNab

**F. E. Connors,** vice-president of the Spokane & Eastern and the Inland Empire, whose death on February 27 at Spokane, Wash., was reported in the *Railway Age* of March 3, was born on October 6, 1869, at San Francisco, Cal. He entered railway service on August 15, 1885, in the employ of the Chicago & Alton, with which company he remained until October 20, 1890, when he was employed as a clerk in the stationery department of the Atchison, Topeka & Santa Fe at Topeka, Kan. He served in this capacity until May 15, 1895, when he was transferred as a clerk to the purchases and stores department at Chicago. He was consecutively promoted in the same department to assistant chief clerk, chief clerk and assistant purchasing agent. He was subsequently promoted to assistant to the vice-president, with headquarters in Chicago, which position he held until January 10, 1919. On this date he was appointed receiver of the Spokane & Inland Empire, with headquarters at Spokane, Wash., and when the reorganization of the properties was effected on February 1, 1920, he was appointed vice-president of the Spokane & Eastern and the Inland Empire. He was serving in this capacity at the time of his death.

**C. E. Lindsay,** special engineer on the New York Central, with headquarters at New York City, died on February 17 of spinal meningitis. Mr. Lindsay was born at Philadelphia, Pa., on March 21, 1865, and graduated from the University of Pennsylvania in 1883. He entered railway service in 1886 as a topographer on surveys for the Union Pacific and in 1888 became a levelman on the construction of the Cincinnati & Richmond branch of the Pennsylvania Railroad, later being promoted to assistant engineer on the Western division of the Pittsburgh, Fort Wayne & Chicago and to engineer maintenance of way of the Pittsburgh, Cincinnati, Chicago & St. Louis, a position in which he served until 1898, when he left that road to become a roadmaster on the Southern. In September, 1901, Mr. Lindsay was appointed division engineer on the Pennsylvania division of the New York Central and in 1903 he was transferred to the Middle division, with headquarters at Albany, N. Y., where he remained until May 1, 1907, when he was appointed engineer maintenance of way of the electrified zone, with headquarters at New York City, later being transferred to the Mohawk division, with headquarters at Albany. On June 1, 1918, he left the New York Central to become a member of the Board of Wages and Working Conditions of the United States Railroad Administration and later a member of the Bi-Partisan Board. When the Railroad Labor Board was created he was appointed a member of the Conference Committee of Managers, remaining at this work until March, 1920, when he returned to the New York Central as a special engineer, the position he held at the time of his death.

C. E. Lindsay

**C. A. Howe,** general purchasing agent of the Missouri Pacific with headquarters at St. Louis, Mo., died in that city on March 5.

**Charlemagne Tower,** at one time president of the Duluth & Iron Range, died on February 24 at Philadelphia. Mr. Tower was in diplomatic service for a number of years, having served as American minister to Austria and ambassador to Russia and Germany.